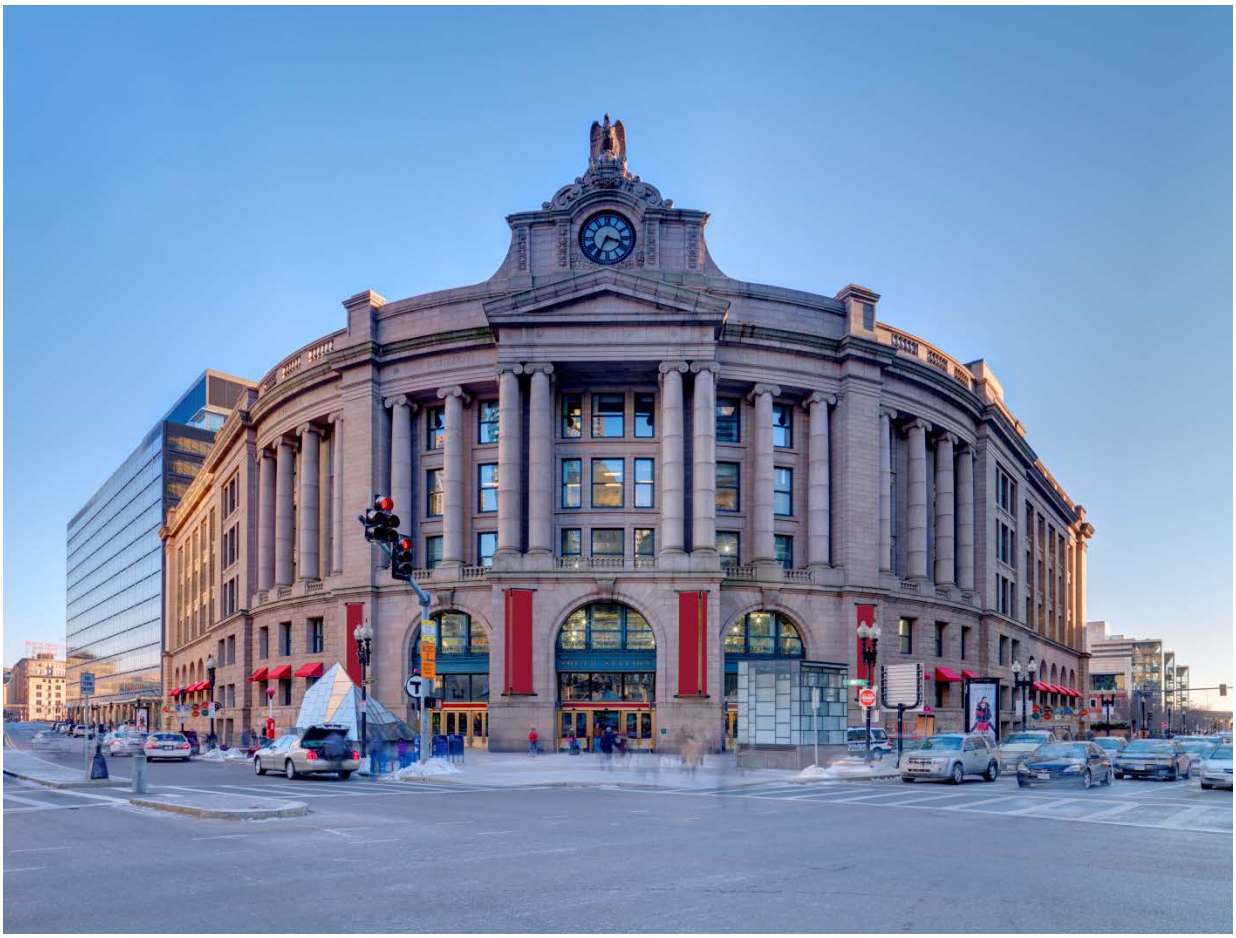
SOUTH STATION
EXPANSION



South Station Expansion Project – EEA No. 15028

Final Environmental Impact Report

June 2016

massDOT
Massachusetts Department of Transportation

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Chapter 1 – Introduction and Project Summary

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1.1. Introduction

The Massachusetts Department of Transportation (MassDOT), the Massachusetts Bay Transportation Authority (MBTA), and the National Railroad Passenger Corporation (Amtrak) have for decades identified the expansion of rail capacity at South Station as a crucial transportation need, one that has been articulated in multiple local, regional, state, and Northeast Corridor (NEC)-wide planning documents.[1] In cooperation with the Federal Railroad Administration (FRA), Amtrak, and the MBTA, MassDOT is now pursuing the expansion of South Station.

1.1.1. Project Purpose

The purpose of the South Station Expansion (SSX) project is to expand South Station terminal capacity and related layover capacity in order to meet current and anticipated future high-speed, intercity, and commuter rail service needs. The expansion of South Station would enable growth in passenger rail transportation along the NEC and within the Commonwealth of Massachusetts. The project would improve the passenger experience of using South Station, promote city-building in a key area of Boston, and allow for Dorchester Avenue to be reopened for public use and enjoyment for the first time in decades.

1.1.2. Project Need

South Station is a critical component of transportation infrastructure for the City of Boston and the Boston metropolitan area, and is Boston's busiest intermodal and multimodal transportation hub. South Station today has fewer than half the original number of tracks that were available when the station first opened in 1899, but it continues to serve as the most heavily used passenger rail facility in New England. Currently, all 13 existing tracks are fully used by Amtrak and the MBTA, and both operators are severely limited in their ability to increase service or offer new services due to the constrained size and configuration of the station and terminal facilities. Terminal capacity constraints currently degrade service reliability and will inhibit future service delivery. The most critical piece of South Station's track infrastructure is the Tower 1 Interlocking (a series of signals and switches), which has failed twice in recent months and, in its current configuration, severely limits the number of trains that can simultaneously approach the station. South Station's passenger facilities, including platforms, waiting areas, and customer support services, do not meet preferred standards for passenger transit facilities. Additionally, midday vehicle layover capacity for the MBTA's south side commuter rail service area is needed to allow the commuter rail system to expand in the future.

At a local level, South Station is viewed as a key gateway linking downtown Boston and the emerging South Boston Waterfront/ Innovation District. With recent growth in the area, including the relocation of General Electric Co., there is an increased demand for improved transportation services, specifically at South Station.

At a regional level, travel demand is expected to grow faster than the 14% population growth rate anticipated by 2025.[2] Ridership on Amtrak's NEC services is projected to increase from 13 million in 2010 to 23 million in 2030.[3] With capacity already nearly or fully reached, however, the rail system's

[1] Documents citing the need for an expanded South Station include: *Critical Infrastructure Needs on the Northeast Corridor* (2013), *The Northeast Corridor Infrastructure Master Plan* (2010); *The Amtrak Vision for High-Speed Rail in the Northeast Corridor* (2010), *A Vision for the Northeast Corridor* (2012), the *Massachusetts Department of Transportation Rail Plan* (2010), the *Massachusetts Department of Transportation Freight Plan* (2010), and two recent long range transportation plans of the Boston Region Metropolitan Planning Organization (2007, 2011).

[2] Amtrak. *Northeast Corridor Infrastructure Master Plan*. June 4, 2010. http://www.amtrak.com/ccurl/870/270/Northeast-Corridor-

ability to absorb future demand is limited.

As the number of Amtrak and MBTA commuter trains increase, the existing capacity constraints at South Station will make reliable operations increasingly difficult, which will in turn negatively impact service reliability on the northern portion of the NEC and on the south side of the MBTA commuter rail system. Furthermore, the existing constraints will greatly inhibit the ability of both Amtrak and the MBTA to serve future demand by supplementing existing services or adding new rail service to South Station. Without additional platform track capacity, these services cannot be accommodated and their projected benefits will not be realized.

The expansion of South Station, along with additional layover capacity, would address the above issues and provide a number of benefits related to transportation, the environment, and public amenities, as detailed in Section 1.4 of this report.

1.1.3. Project Review and Analysis

MassDOT secured a grant in 2011 from the FRA to complete environmental review and preliminary engineering for the project. MassDOT filed an Environmental Notification Form (ENF) in April 2013 and a Draft Environmental Impact Report (DEIR) in October 2014. In December 2014, the Secretary of Energy and Environmental Affairs (EEA) issued a Certificate on the DEIR (EEA No. 15028), which stated that the DEIR adequately and properly complied with the Massachusetts Environmental Policy Act (MEPA) and its implementing regulations, and required preparation of this Final Environmental Impact Report (FEIR) of limited scope. A horizon year of 2035 and an approximate opening year of 2025 are used for analysis of the project.

Because MassDOT received grant funding through the FRA, the project also requires review under the National Environmental Policy Act (NEPA). MassDOT is concurrently preparing a separate Environmental Assessment (EA) to comply with NEPA, which is anticipated to be filed in 2017. Project funding for next phases of the project – final design and construction – are anticipated to be provided in the future by other federal and state funding sources.

As required by the Secretary's Certificate, the FEIR provides additional analyses of the project and status updates, including:

- Summary of project benefits (see Section 1.2);
- Description of the project (see Section 1.3);
- Summary of project changes since the DEIR (see Section 1.4);
- Update of project-related activities (see Section 1.5);
- Updated list of possible permits and approvals anticipated for the project (see Section 1.6);
- Project design updates, cost, funding, and schedule (see Chapter 2);
- Updated summaries of project environmental impacts (see Chapter 3);

Infrastructure-Master-Plan.pdf.

[3] Amtrak. *Northeast Corridor Infrastructure Master Plan*. June 4, 2010. http://www.amtrak.com/ccurl/870/270/Northeast-Corridor-Infrastructure-Master-Plan.pdf.

- Expanded discussion of proposed South Station and layover facility improvements and future operations (see Chapter 3 and Appendices D and E);
- Proposed mitigation measures and draft Section 61 Findings for project impacts (see Chapter 4); and
- Responses to comments received on the DEIR (see Chapter 5).

1.2. Summary of Project Benefits

The project provides many benefits related to transportation services, the environment, and public amenities as outlined below and depicted on Figure 1-1.

1.2.1. Transportation

Rail Service

- Improves reliability and performance: The project would improve reliability and provide the ability to meet Amtrak's and the MBTA's established performance goals for service at South Station.
- Increases operational efficiency: New layover facilities and track improvements would increase rail service capacity and efficiency by eliminating the need to store non-revenue trains[4] at the South Station platforms and by expanding track options for arriving and departing trains.
- Supports increased ridership: The project would improve the rail system's ability to absorb future demand along the MBTA's south side commuter rail lines, the NEC, as well as any potential service that could result from the ongoing environmental analysis of the Northern New England Intercity Rail Initiative and the consideration of how it is prioritized in the current update of the Massachusetts State Rail Plan. In the 2025 opening year, the project would support the projected increase in ridership of approximately 16,000 additional daily combined commuter rail and Amtrak intercity rail boardings and alightings at South Station over the No Build Alternative. The project would continue to support ridership growth in 2035, by which time these boardings and alightings would increase to approximately 20,000.[5]
- Addresses midday layover deficiencies: The project contemplates providing additional midday layover space for up to 38 eight-car trainsets to support the growth of the MBTA's south side commuter rail service.

Passenger Experience

- Provides new facilities: The project would provide four new pedestrian platforms and an expanded headhouse; adding approximately 385,000 sf of new circulation space, waiting areas, and amenities for passengers and other station visitors.
- Implements ADA upgrades: Platform upgrades would be implemented to stay current with Americans with Disabilities Act (ADA) and life safety regulations, including emergency egress considerations.

[4] Non-revenue is a railroad industry term used to describe the movement of equipment and/or crews between locations when trains are not in revenue service (such as to and from layover).

[5] See DEIR Chapter 4, Section 4.2.7, for ridership projection details.

Pedestrian Connections

- Extends Harborwalk: Constructing 0.5 miles of the Harborwalk adjacent to Fort Point Channel would close one of the last remaining gaps in an otherwise continuous waterfront walkway. In addition to a dedicated pedestrian path, seating and landscaping would also be provided.
- Improves pedestrian connections: Pedestrian connections and wayfinding would be improved around and through the South Station site to the neighboring communities of the Leather District, Chinatown, the Downtown/Financial District, and the South Boston Waterfront/Innovation District.

Bicycle Accommodations

- Provides new cycle track: Constructing 0.5 miles of cycle track on Dorchester Avenue would provide new connections between Summer Street and the proposed South Bay Harbor Trail in South Boston.
- Provides additional bicycle storage: The project would provide new covered, secure bicycle storage facilities adjacent to the expanded headhouse on Dorchester Avenue.

Vehicular Circulation

- Reopens Dorchester Avenue for public use: The project would reopen approximately 0.5 miles of Dorchester Avenue for public use.
- Improves overall roadway and intersection operations: Mitigation to existing intersections surrounding South Station would improve overall traffic operations and efficiency for vehicles, pedestrians, and cyclists.
- Provides new curbside facilities: The project would relieve congestion and improve safety on Atlantic Avenue by providing a new area for curbside activity on Dorchester Avenue to accommodate taxicabs, drop-off and pick-up, MBTA buses, and private shuttles.

Multimodal Connections

- Improves connectivity: The project would improve station accessibility and mobility for passengers using commuter and regional rail, subway, city and regional buses, pedestrians, bicyclists, taxis, and private vehicles.
- Provides opportunity for improved bus connections: Reopening Dorchester Avenue presents an opportunity for bus connections to Downtown Boston and the South Boston Waterfront/Innovation District.

1.2.2. Environment

- Incorporates sustainability: The project incorporates sustainable design measures, including climate change adaptation strategy. MassDOT would consider implementation of Leadership in Energy and Environmental and Design (LEED) standards and use of the Federal Highway Administration (FHWA) Infrastructure Voluntary Evaluation Sustainability Tool (INVEST) as guidance for final design.
- Meets air quality standards: The project would not lead to any exceedances of air quality standards, nor would it have any adverse air quality impacts.

- Reduces greenhouse gas emissions: As a result of compliance with the Massachusetts Stretch Energy Code, project-related stationary source GHG emissions at South Station would be reduced by approximately 8%. Reduced congestion and idling time on the tracks from locomotives near South Station would reduce carbon dioxide (CO_2) emissions from that source by approximately 5%, and would save approximately 46,000 tons of CO_2 per year regionally.
- Improves stormwater management: The project would include stormwater management measures designed to reduce volume and peak runoff rates and improve water quality, in many instances resulting in an improvement over pre-development conditions.
- Increases public open space: The project would result in an increase in public open space of approximately 4.7 acres,[6] including the conversion of portions of the restricted Dorchester Avenue to publicly accessible sidewalks, the Harborwalk and cycle track.

1.2.3. Public Amenities

- Restores public waterfront access via the Harborwalk: Public access to the waterfront would be restored through the conversion of approximately five acres of filled tidelands, currently occupied by the USPS, to a combination of rail transportation improvements, walkways, roadway, and cycle track.
- Improves the public realm: New and expanded urban landscaping and appropriate lighting and signage on Dorchester Avenue and along the Harborwalk would provide a safe, well-lit environment on a 24-hour basis.

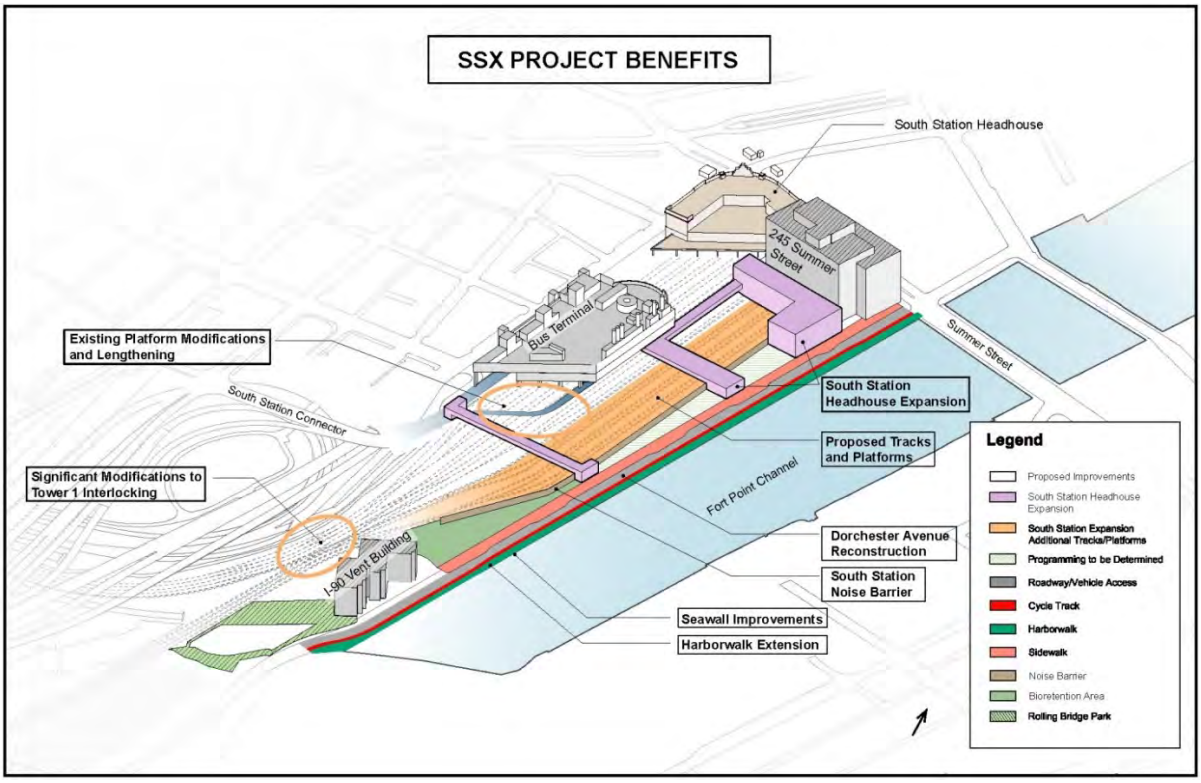

Figure 1-1 — SSX Project Benefits

[6] New open space includes sidewalks, the cycle track, and the Harborwalk within the reopened Dorchester Avenue, and areas adjacent to the expanded headhouse.

1.3. The Project

The preferred alternative, referred to as "the project," includes the 49-acre site located in and around the existing South Station Transportation Center, which consists of the South Station Rail/Transit Terminal, South Station Bus Terminal and existing United States Postal Service (USPS) property, Dorchester Avenue, and adjacent roadways. Additionally, the project contemplates two proposed layover facility sites, the expansion of the existing MBTA layover facility at Readville – Yard 2 in Hyde Park and the creation of a new layover facility at Widett Circle in South Boston. Beacon Park Yard in Allston, previously identified as a third layover facility alternative in the DEIR, is now subject to environmental review as part of the I-90 Allston Interchange project. The decision to separate the Beacon Park Yard layover site from the South Station DEIR and include it in the Allston project was done both to provide a more focused discussion of impacts in the affected community and in acknowledgment of the fact that the Allston project, including the construction of the Beacon Park Yard layover facility, is expected to advance to construction prior to South Station. Figures 1-2, 1-3, 1-7, and 1-8 depict existing conditions at the project sites. The following sections describe the activities that would take place at the project sites.

1.3.1. Upgrade Existing Rail Infrastructure

The project would include improvements to the existing rail infrastructure at South Station Terminal and the approach interlockings. The aging rail infrastructure at the Terminal, including tracks, signals, and communication, have contributed to service delays and upgrading these systems will have a direct improvement to service reliability and capacity. Modifications to Tower 1 Interlocking, as well as one approach interlocking, would be required in order to reduce conflicting movements through the terminal area and improve efficiencies (refer to Figure 3-15). An interlocking is a segment of railroad infrastructure comprised of track, turnouts, and signals linked (interlocked) in a way that allows trains to move from one track to another, or across tracks safely, preventing conflicting train movements. The interlockings enable train dispatchers to route incoming trains over a variety of tracks to/from available station tracks. An approach interlocking is an interlocking leading up to a terminal interlocking and station. Typically, approach interlockings are only a short distance from the terminal and allow trains to switch tracks leading into the terminal to prepare to berth at specific platform tracks. Making these movements at the approach interlocking instead of at the terminal also allows for more efficient operations as the crossing movements can be made at higher speeds while avoiding conflicting movements.

1.3.2. Expand South Station Terminal

The project would result in the expansion of South Station Terminal, adding seven new tracks and four platforms for a total of 20 tracks and 11 platforms. Figures 1-4 and 1-5 depict proposed conditions at the South Station site. Reconfiguration of several existing tracks and platforms would be required and platform lengths would be designed to meet Amtrak's and the MBTA's future berthing requirements.[7] The proposed platform upgrades would improve existing access and emergency egress measures. The new tracks, platforms, and station expansion would be aligned so that it would not preclude any future air rights development.

The expansion of the South Station Terminal would include the addition of new structures totaling approximately 385,000 sf, including an expanded headhouse, with a major station entrance along Dorchester Avenue, to provide larger passenger circulation and waiting areas as well as amenities such as

[7] The future berthing requirement is the length of track adjacent to the platform required to allow passengers to enter or exit the train cars. This length is based on potential future trainset length.

retail and food outlets. The station expansion would also include a mid-platform elevated concourse. The concourse would span above the new and existing platforms, located at the midpoint of the platforms' north-south axis. The concourse would provide a direct connection to the existing bus terminal, a direct connection to the existing headhouse, and would also provide a mid-block pedestrian connection between Atlantic Avenue and the newly reopened Dorchester Avenue. The vertical connection between the elevated concourse and the historic headhouse would be coordinated with the vertical elements planned as part of the South Station Air Rights (SSAR) Project.

The proposed station would have two access points on Dorchester Avenue. The more prominent one would be proximate to the Dorchester Avenue and Summer Street intersection and would provide direct access to the trackhead and the existing headhouse. The other would provide direct access to the mid-platform elevated concourse. Both access points would be designed to accommodate integration with future development on the remaining land along Dorchester Avenue.

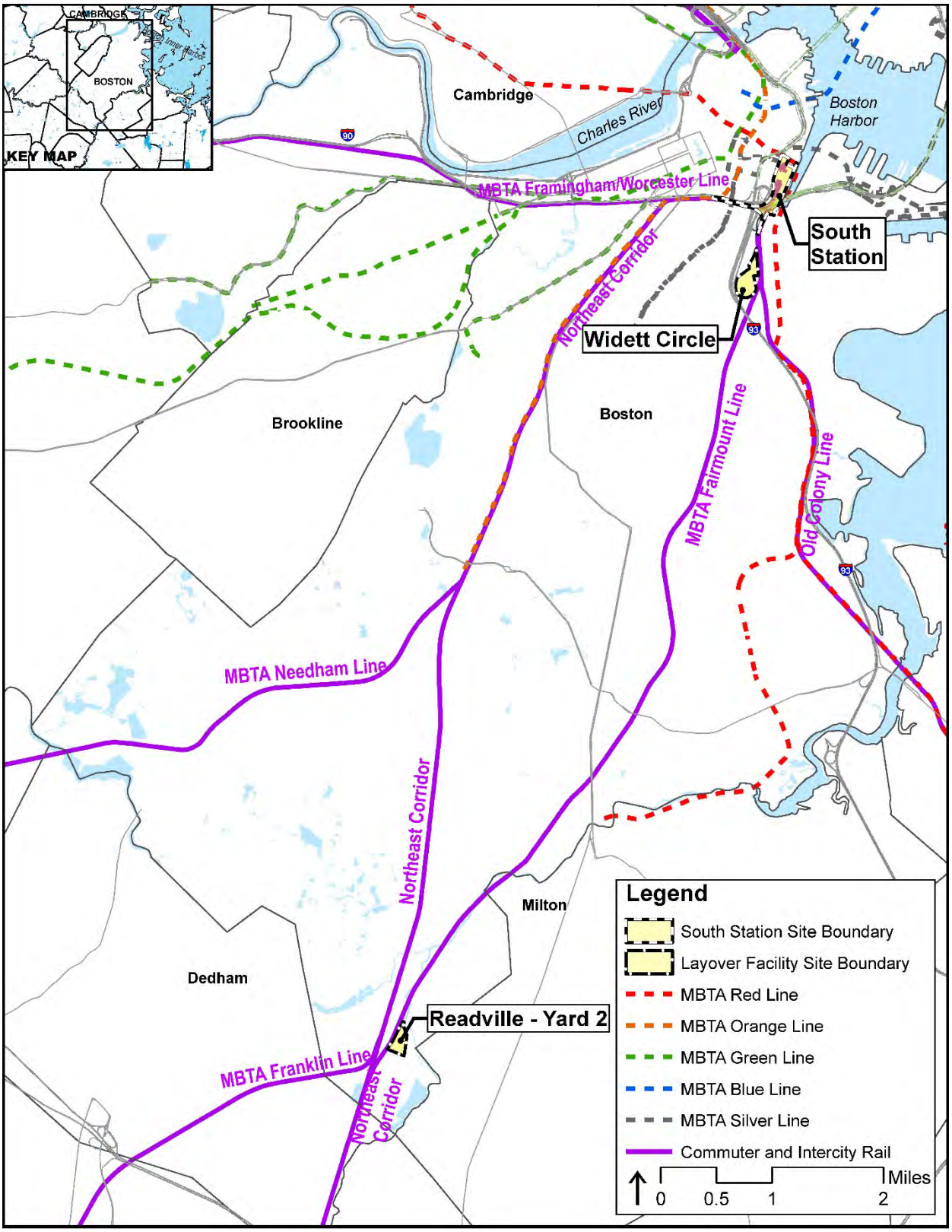

Figure 1-2 — Project Location Plan

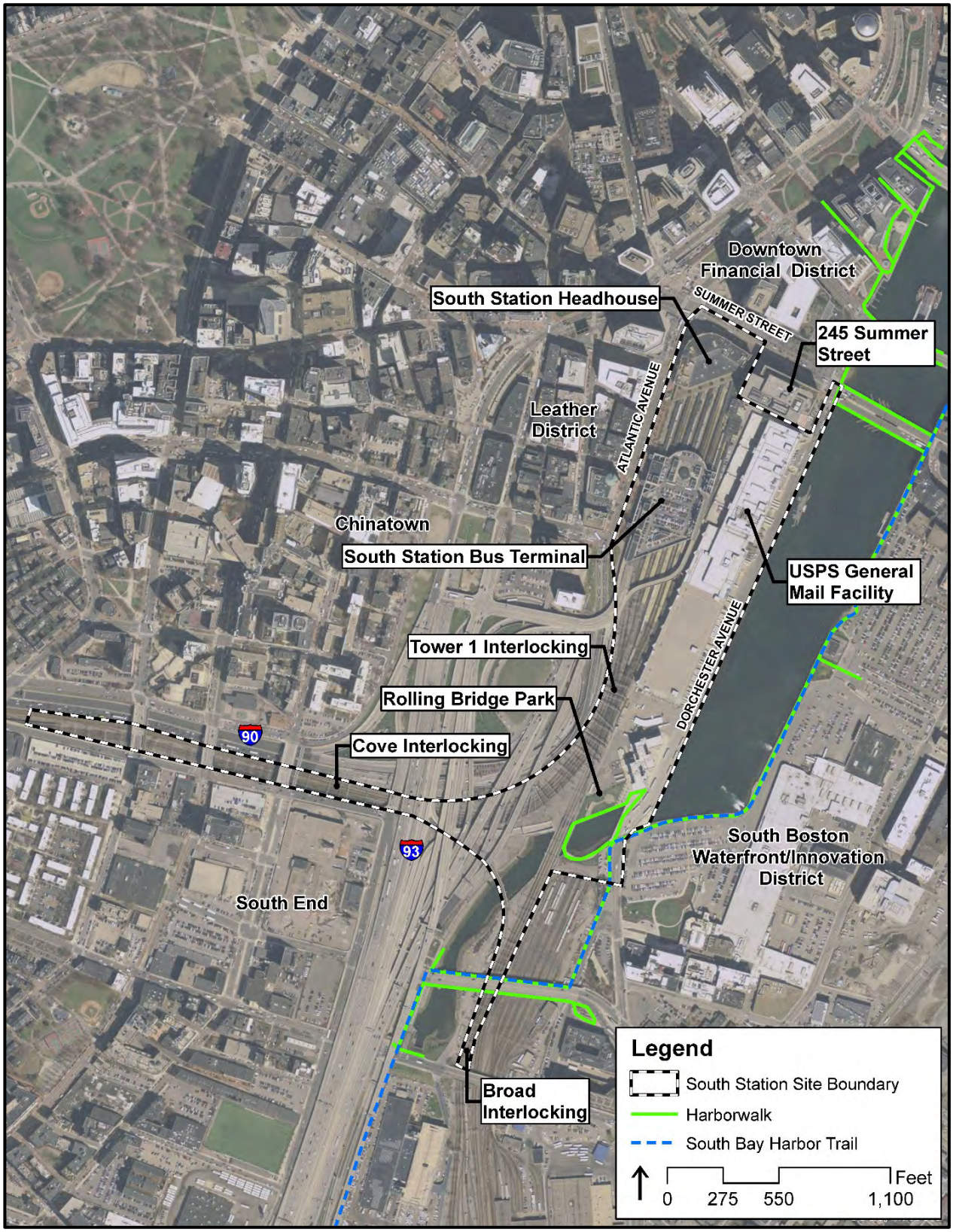

Figure 1-3 — South Station Site – Existing Conditions

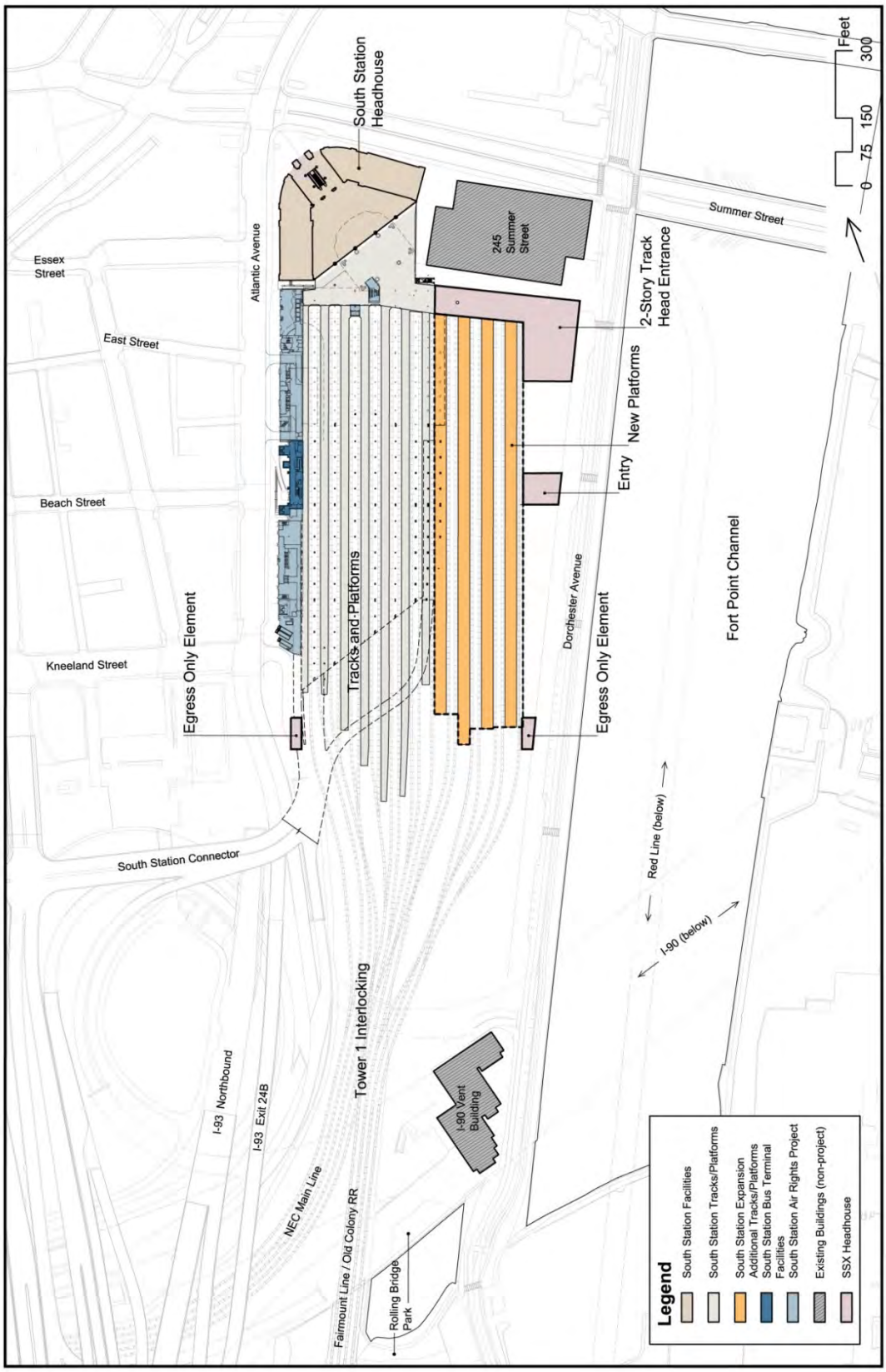

Figure 1-4 — South Station Site – Proposed Platform Level

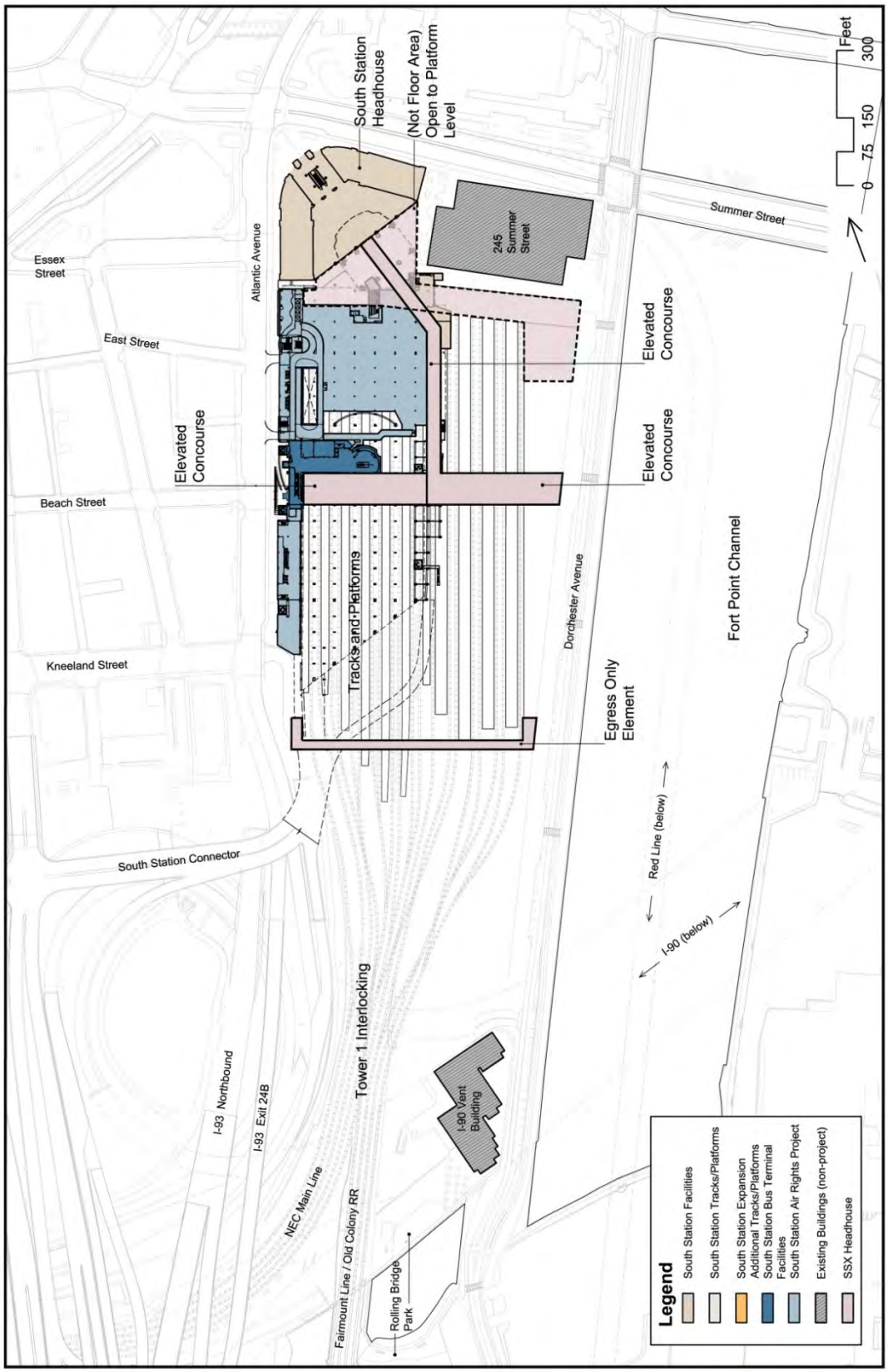

Figure 1-5 — South Station Site – Proposed Elevated Concourse Level

1.3.3. Reopen Dorchester Avenue and Extend the Harborwalk

Currently, access along the majority of Dorchester Avenue in the immediate vicinity of South Station is restricted for use by the USPS in support of its operations, with very limited public access allowed for USPS customers and MBTA commuters. The project would restore approximately 0.5 miles of Dorchester Avenue for public use and provide for multiple access points into the expanded station from Dorchester Avenue. These access points would allow passengers multiple station arrival and departure options and would provide connectivity through the station between Atlantic Avenue and Dorchester Avenue. Restoration of Dorchester Avenue includes landscaping and improved pedestrian and cycling connections and facilities, including adjacent sidewalks and crosswalks. Figure 1-6 presents a typical cross section for Dorchester Avenue.

Restoration of Dorchester Avenue would include construction of a long-awaited 0.5-mile section of the Harborwalk network. The Harborwalk is a 40-mile public walkway extending along the Boston Harbor waterfront. As depicted in Figure 1-3, in the vicinity of the project, the Harborwalk extends to the north and south along Fort Point Channel in the vicinity of the project. There is currently no Harborwalk along Dorchester Avenue between Summer Street and Rolling Bridge Park. The project's Harborwalk extension would close one of the last remaining gaps in an otherwise continuous waterfront walkway. It would include landscaping and street furniture, and would add more than one acre of open space to the area.

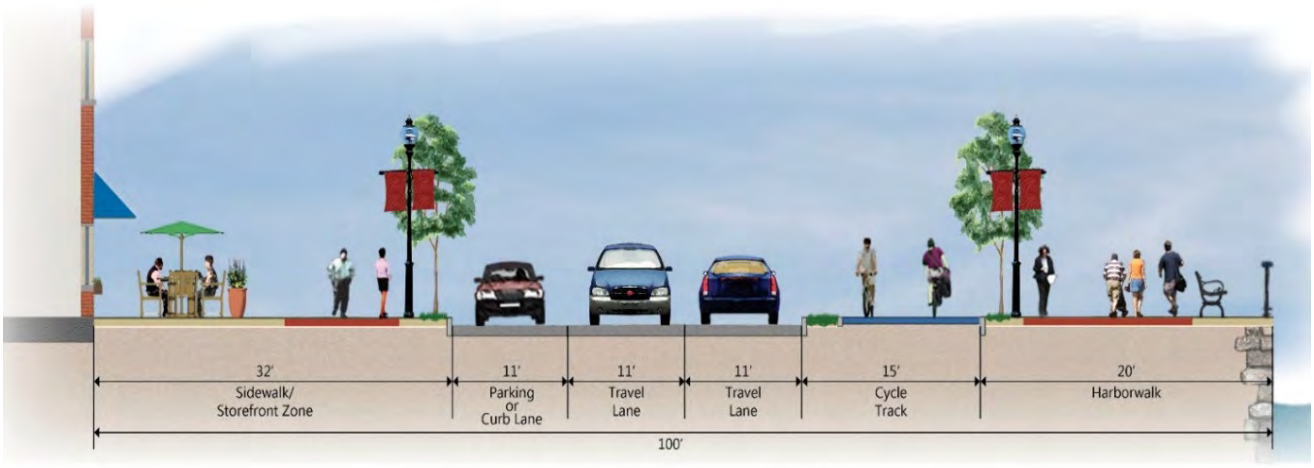

Figure 1-6 — Dorchester Avenue – Typical Cross-Section

1.3.4. Acquire and Demolish the USPS Facility

The project would involve acquisition and demolition of the USPS General Mail Facility (GMF) located on Dorchester Avenue adjacent to South Station, which would provide an approximately 14-acre site on which to expand South Station. Although demolition of the USPS facility after it is vacated is part of the project for the purposes of environmental review, the relocation of USPS operations is not part of the project. The USPS would determine the future location(s) to which its operations would be relocated, and the relocation would be subject to its own environmental review as required by state and federal regulations. Should the acquisition of the USPS advance before funding is identified for the entire project, MassDOT may consider moving forward with the demolition of the USPS and reopening of Dorchester Avenue (along with associated Harborwalk improvements) before other project elements in order to provide improved public access along the Fort Point Channel.

1.3.5. Construct Rail Layover Facilities

The project is designed to provide additional midday layover capacity to meet south side midday layover facility program needs and railroad operation requirements. Due to a lack of midday layover space, the MBTA is currently forced to store trains at the station platforms while waiting for space to become available for them to layover at any of the existing sites. This storage problem would be exacerbated by the projected increase in MBTA and Amtrak service. As mentioned earlier, MassDOT and the MBTA are currently developing a DEIR for the Allston Interchange project that includes the construction of a midday layover facility in Beacon Park Yard. That facility, which is particularly well situated for service arriving from the west of Boston, is expected to be constructed and in service in advance of the ultimate construction of the South Station Expansion project. This FEIR contemplates providing additional midday layover space by constructing a new facility at Widett Circle and expanding the existing MBTA Readville – Yard 2[8] layover facility to meet current and future layover facility program needs and operational requirements.[9]

The Widett Circle layover facility site, totaling approximately 30.2 acres, is located in South Boston along the MBTA's Fairmount Line, approximately one track-mile from South Station, as shown in Figure 1-7. It is comprised of two parcels, primarily in private ownership, known as the Cold Storage and Widett Circle properties. The Cold Storage property, located at 100 Widett Circle, currently houses a temperature controlled food storage and distribution facility, owned by Art Mortgage Borrower Propco 2006-2 LP, and used by Americold/Crocker & Winsor Seafoods. Widett Circle, located primarily at 1 and 2 Foodmart Road, is owned by The New Boston Food Market Development Corporation and is made up of approximately 30 units leased to multiple businesses in the food processing, food storage, and food logistics industry. This project proposes construction of a new layover facility at this site for up to 30 eight-car trainsets. Support facilities would include a crew building, support shed, and power substation, totaling approximately 44,000 sf. FEIR Section 3.3 addresses project property land use and ownership in more detail.

The Readville – Yard 2 layover facility site, totaling approximately 17.5 acres, is located in the Readville section of Hyde Park, at the intersection of the NEC and the MBTA's Fairmount Line, approximately 8.8 track-miles from South Station, as shown in Figure 1-8. Owned by the MBTA, Readville – Yard 2 is a currently maintenance repair facility and the largest midday layover yard used by the MBTA for its south side commuter service. The MBTA currently uses Readville – Yard 2 for midday layover storage of 10 trainsets of variable lengths. The project proposes to expand the existing layover facility by up to eight eight-car trainsets, for total layover site capacity of 18 trainsets. Support facilities would include expansion of the existing crew building and support shed, and construction of a power substation, totaling approximately 11,700 sf.

[8] Beacon Park Yard in Allston, previously identified as a third layover facility alternative in the DEIR, is now subject to environmental review as part of the I-90 Allston Interchange project (EEA No. 15278). The I-90 Allston Interchange project is further refining the concept design and environmental evaluation of Beacon Park Yard, which is occurring concurrently with the SSX project.

[9] A detailed layover facility site alternatives analysis is included in Appendix C of the SSX Environmental Notification Form (March, 2013).

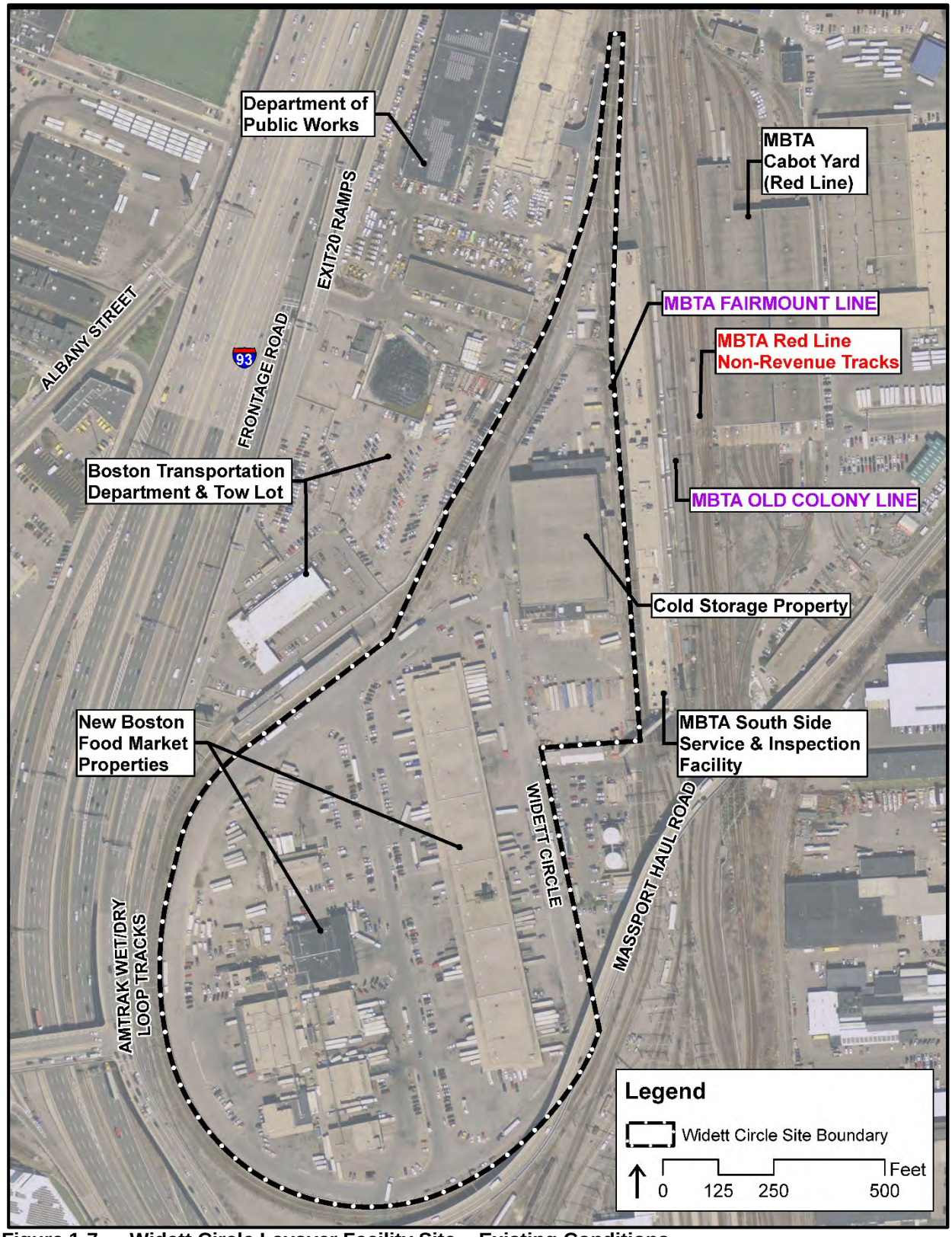

Figure 1-7 — Widett Circle Layover Facility Site – Existing Conditions

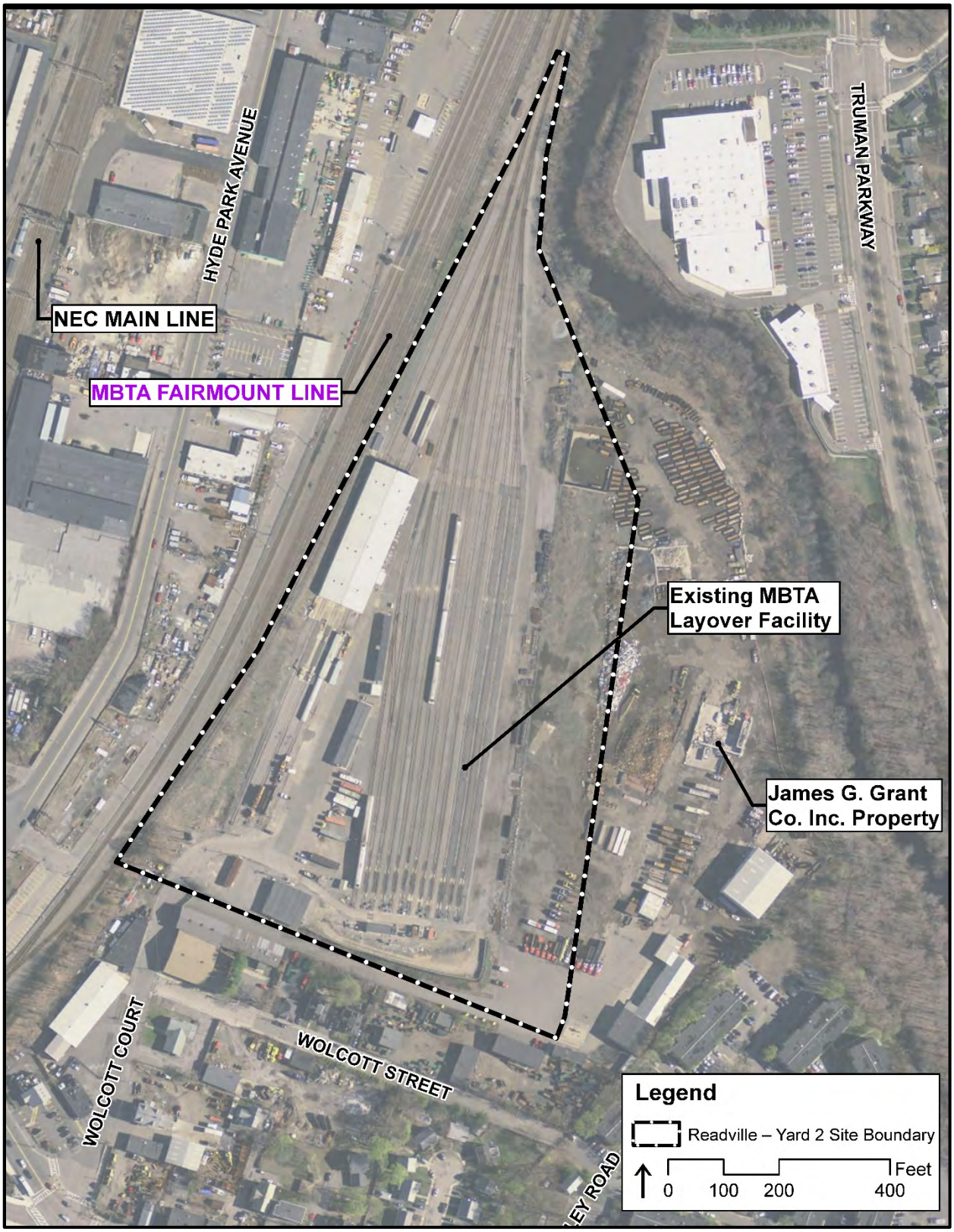

Figure 1-8 — Readville – Yard 2 Layover Facility Site – Existing Conditions

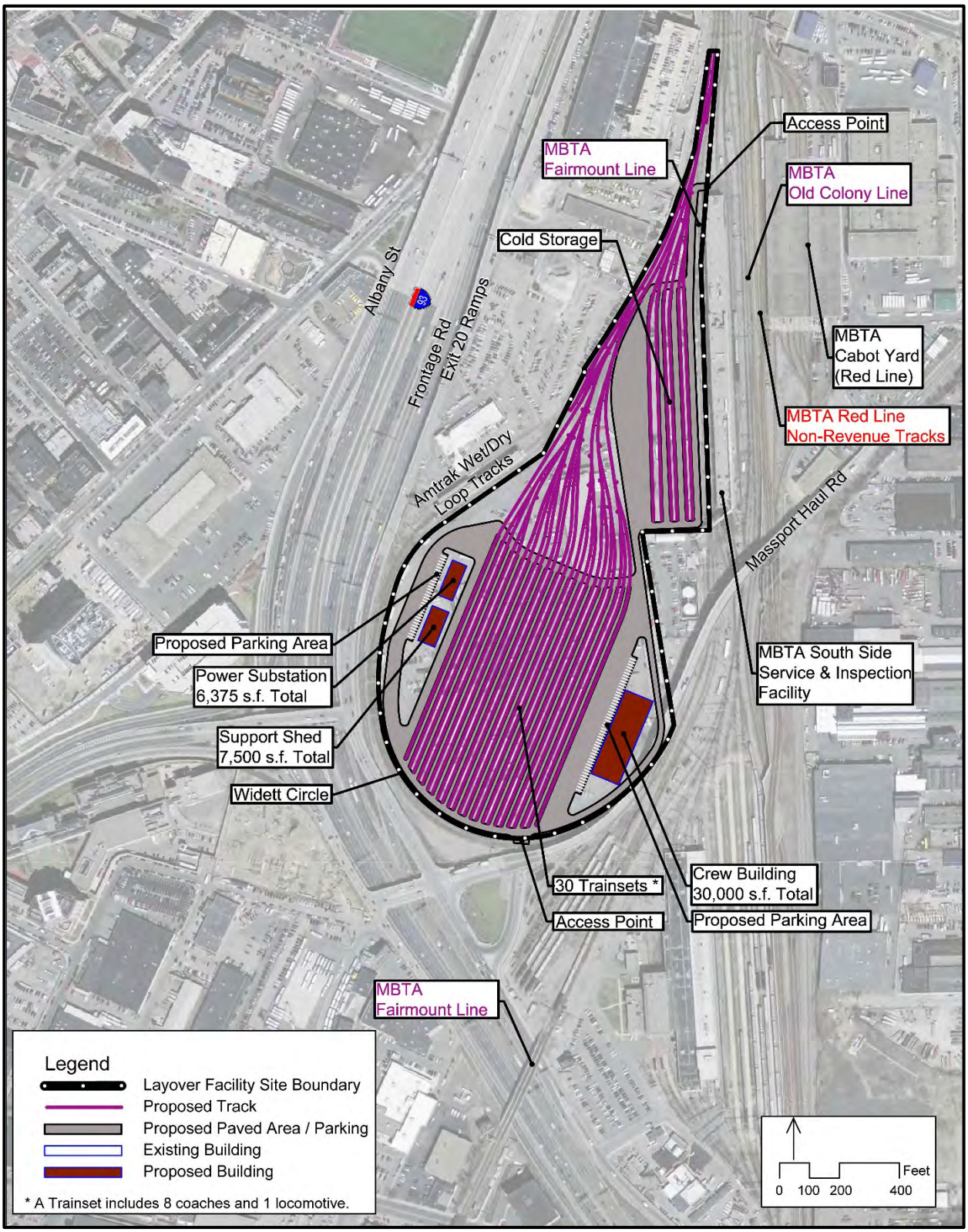

Figure 1-9 — Widett Circle - Concept Plan

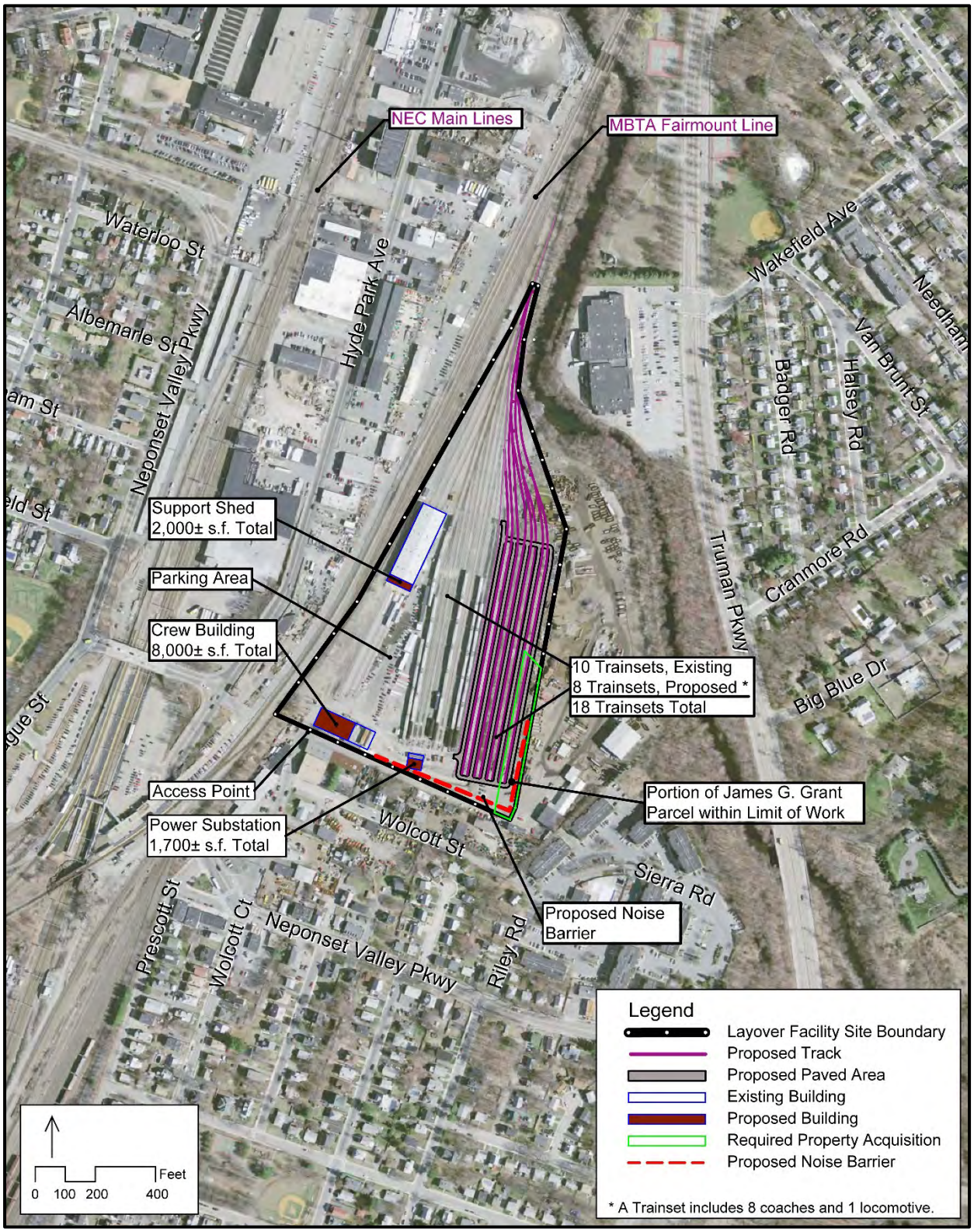

Figure 1-10 — Readville – Yard 2 - Concept Plan

1.4. Summary of Project Changes since the DEIR

This section highlights key changes to the project since the October 2014 release of the DEIR. The project website [http://www.massdot.state.ma.us/southstationexpansion] provides links to the full DEIR document, which presents a comprehensive alternatives analyses, existing conditions evaluation, impact methodologies, and results of the environmental evaluation. Hyperlinks to each DEIR section are also provided in Appendix H, *DEIR Web Links*.

The project has been modified since the issuance of the Secretary's Certificate on the DEIR in the following manner:

- The DEIR identified four alternatives for the expansion of the South Station Terminal:
    - No Build Alternative
    - Alternative 1 – Transportation Improvements Only
    - Alternative 2 – Joint/Private Development Minimum Build
    - Alternative 3 – Joint/Private Development Maximum Build

  After reviewing the DEIR alternatives for South Station, MassDOT determined that the "Transportation Improvements Only" (TIO) alternative (previously analyzed as DEIR Alternative 1) will advance as the preferred alternative in the FEIR and the EA.

- MassDOT selected Widett Circle in South Boston and Readville – Yard 2 in Hyde Park for further consideration in the FEIR as midday layover facilities. Beacon Park Yard in Allston, previously identified as a third layover facility alternative in the DEIR, is now subject to environmental review as part of the I-90 Allston Interchange project (EEA No. 15278).[10] The I-90 Allston Interchange project is further refining the concept design and environmental evaluation of Beacon Park Yard.

- In consultation with the City of Boston, MassDOT has selected a preferred alternative that does not include joint development, thereby eliminating the environmental impacts of the project associated with those development scenarios. The design of the expanded headhouse and terminal will not preclude, and to the extent practicable, will support private transit-oriented development in the future. MassDOT continues to be committed to working with the City of Boston, interested stakeholders, and the general public to ultimately realize a vision of an expanded South Station integrated with transit-oriented development that contributes to a vibrant downtown Boston with private development and non-transportation uses. However, with the City of Boston currently engaged in the Imagine Boston planning process, it would be premature to provide information on the development component of SSX at this time.

- Since the DEIR, the size of the South Station Terminal expansion has been reduced from approximately 400,000 square feet (sf) to approximately 385,000 sf. The locations of the headhouse, pedestrian access points, and elevated concourses have been further refined. The updated design modifications are further described in Section 2.1.1, Update on South Station Headhouse Design.

[10] For the purpose of the 2035 operations analysis, future MBTA proposed midday layover facilities were assumed at Widett Circle and Beacon Park Yard in addition to expanding the existing facilities at the MBTA's South Side Servicing and Inspection (S&I) and Readville - Yard 2 facilities, as further described in Appendix E, Railroad Operations Analysis Technical Report.

- Since the DEIR, a proposal to raise a portion of the Fort Point Channel seawall has been added to the project, largely in response to updated projections of sea level rise of nearly two feet by the year 2050. In order to mitigate potential flooding on the future South Station site, a lower portion of the seawall and Dorchester Avenue would be raised to match the elevation of the existing seawall to the north and south. Raising the seawall and adjacent roadway in this manner would help protect the South Station site, in the area along Dorchester Avenue where the USPS facility is currently located, from future coastal storm flooding.

- Additionally, since the DEIR, a number of analyses of environmental impacts have been updated, including: floodplains; water quality and stormwater; water use and wastewater; climate change; and greenhouse gas (GHG) emissions. These analyses are described in detail in Chapter 3, Environmental Analyses.

1.5. Status Updates on Project-Related Activities

The Secretary's Certificate requested that the FEIR include status updates for the following project-related activities:

- Public Outreach Activities (see Section 1.5.1);
- Section 106 Review Process (see Section 1.5.2);
- South Station Air Rights (SSAR) Project (see Section 1.5.3);
- I-90 Allston Interchange Project/Beacon Park Yard (see Section 1.5.4); and
- North/South Rail Link Project (see Section 1.5.5).

1.5.1. Update on Public Outreach Activities

Appendix 1 of the DEIR summarized MassDOT's public involvement and agency coordination efforts for the environmental review and design phases of the project. The project's Public Involvement Plan (PIP), which lays out specific strategies for implementing MassDOT's outreach goals, is provided on the project website at http://www.massdot.state.ma.us/southstationexpansion/home.aspx. The PIP complies with MassDOT's policies regarding Environmental Justice, Title VI, and accessibility. The following section provides an update to public outreach efforts since the release of the DEIR, as required by the Secretary's Certificate.

MassDOT continues to implement its public outreach program outlined in the PIP. Activities conducted since the DEIR include:

- Developed and distributed a project fact sheet outlining the elements of the FEIR and a fact sheet on layover facility alternatives;
- Briefed the City of Boston's Office of Neighborhood Services, the Boston Redevelopment Authority and the Mayor's Office on the development of the FEIR and its recommendations;
- Held a series of briefings and/or corresponded with local agencies and other stakeholders in spring 2016 to provide project information to project area neighborhoods;
- Developed a layover facility outreach activities plan in coordination with the release of the FEIR, and invited community groups and area residents to attend a briefing in the Widett and Readville neighborhoods to learn about the FEIR and encourage review and comments on the document;

- Disseminated email notices about all project publications, meetings, blogs and other social marketing and events;
- Tracked issues from meetings, email comments and other input provided to the team; and
- Publicized project meetings and events through media advisories and other opportunities.

MassDOT continues to coordinate its project planning with the City of Boston; the MBTA and its commuter rail operator; Massport; the FRA; Amtrak; and other state and federal agencies.

1.5.2. Update on the Section 106 Review Process

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to take into account the effects of their undertakings on historic properties. MassDOT anticipates the FRA will submit the Section 106 report to the Massachusetts Historical Commission (MHC) in summer 2016. It indicates that at South Station, the project, implemented with noise mitigation and designed consistent with the historic preservation design principles, would have no adverse effect on historic properties. No historic properties would be affected in the vicinity of the layover facilities. The EA is scheduled for circulation in 2017.

1.5.3. Update on the South Station Air Rights Project

The Secretary's Certificate requested additional analysis of how proposed platform lengths, column placement, passenger waiting areas, and passenger access points are reliant on action to be undertaken by either SSAR or MassDOT. The Secretary also requested a discussion of contingencies in MassDOT's Preferred Alternative design if SSAR does not proceed prior to the SSX project.

Prior to the expansion of South Station, MassDOT anticipates that the site would include the planned SSAR project, consisting of approximately 1.8 million square feet of mixed-use development to be located directly above the railroad tracks at the existing South Station headhouse. The SSAR project would also include expansion of the existing bus terminal towards the existing headhouse. The SSAR project was approved by the Secretary of EEA in 2006.[11] However, the developer has not yet begun construction. Nonetheless, for environmental review of the SSX project, the SSAR project is assumed to be built for the future year analysis, and is part of the SSX project's No Build Alternative.

The current project design is not dependent on the prior construction of the SSAR project, nor does it inhibit the ability to build the SSAR project subsequent to SSX project completion, should that be the order in which construction occurs. If the project were to be built without needing to accommodate the SSAR project as it is currently designed, the circulation at the ground level and trackhead could be improved, and a direct connection to the existing headhouse could be made without any obstructions. MassDOT understands that a SSAR Notice of Project Change is forthcoming. Coordination between MassDOT and the SSAR project proponent will continue as design of each project advances.

1.5.4. I-90 Allston Interchange Project/Beacon Park Yard

The purpose of the I-90 Allston Interchange project is to reconstruct the functionally obsolete viaduct between the Allston-Brighton tolls and Commonwealth Avenue. In addition, MassDOT plans to remove the I-90 tollbooths and replace them with an overhead All Electronic Tolling System, which would allow

[11] The South Station Air Rights (SSAR) project was approved by the Secretary of the Executive Office of Energy and Environmental Affairs (EEA) in 2006 (EEA No. 3205/9131).

realignment of the highway and simplification of the Allston-Brighton interchange. As previously noted, the I-90 Allston Interchange project team is further refining the concept design and performing the environmental evaluation of Beacon Park Yard as a future layover yard and maintenance facility.

MassDOT submitted an ENF for the project in October 2014 (EEA No. 15278), and received a Certificate from the Secretary of EEA in December 2014. Since that time, MassDOT has refined the design concepts identified in the ENF in association with the project stakeholders, and is evaluating the alternatives put forth by the project's task force members. MassDOT expects to submit a DEIR in spring 2017.

1.5.5. North/South Rail Link Project

MassDOT's *draft 2017 – 2021 Capital Investment Plan* (CIP) has $2.0 million programmed for a North/South Rail Link corridor and area planning study. MassDOT continues to commit to expanding South Station in such a way that the goals of the project can be met without eliminating the potential for future underground infrastructure, such as tunnel portals and station locations.

1.6. Anticipated Permits and Approvals

Table 1-1 lists federal, state, and local agency permits and approvals that are anticipated for the project.

Table 1-1 — Anticipated Permits, Approvals and Notifications

Agency	Permit, Approval or Notification	South Station	Layover Facilities
Federal			
Federal Railroad Administration (FRA)	• Finding of No Significant Impact • Section 4(f) Determination • Section 106 Finding • Federal funding approval	yes	yes
Federal Aviation Administration (FAA)	• Notice of Proposed Construction or Alteration	yes	no
Massachusetts Historical Commission (MHC)	• State Register Review • Section 106 Review	yes	yes
Massachusetts Office of Coastal Zone Management (CZM)	• Federal Consistency Certification	yes	Widett Circle only
U.S. Army Corps of Engineers (USACE)	• Section 404 Water Quality Certification	no	if required
U.S. Environmental Protection Agency (U.S. EPA)	• National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges from Construction Sites	yes	yes
	• NPDES Industrial Stormwater Permit for Stormwater Discharges	no	if required
	• Notification of Building Demolition	yes	yes
State			
Massachusetts Department of Environmental Protection (MassDEP)	• Chapter 91 Waterways License	yes	no
	• Stormwater Management Standards Compliance Review	yes	yes
	• Sewer Extension/Connection Compliance Certification	yes	yes
	• Massachusetts Contingency Plan Review/Preliminary Determination	yes	yes
	• Notification Prior to Construction or Demolition	yes	yes

Agency	Permit, Approval or Notification	South Station	Layover Facilities
	• Asbestos Notification/Mass Department of Labor and Workforce Development, Division of Occupational Safety (DOS)	yes	yes
	• Section 401 Water Quality Certificate	no	if required
Massachusetts Department of Public Safety	• Building Permit	yes	yes
Massachusetts Executive Office of Energy and Environmental Affairs (EEA)	• Massachusetts Environmental Policy Act Review/ FEIR Certificate	yes	yes
	• Public Benefit Determination	yes	yes
Massachusetts Water Resources Authority (MWRA)	• Temporary Construction Site Dewatering Discharge Permit	if required	if required
	• 8(m) Permit	if required	if required
Local			
Boston Conservation Commission	• Order of Conditions (Massachusetts Wetlands Protection Act)	yes	yes
Boston Department of Parks and Recreation	• Review of construction within 100 feet of a park	yes	no
Boston Fire Department	• Demolition and construction-related permits	yes	no
Boston Public Improvement Commission (PIC)	• Approvals	yes	yes
Boston Transportation Department (BTD)	• Signal Change Approval	yes	yes
	• Construction Management Plan	yes	yes
Boston Water and Sewer Commission (BWSC)	• Demolition Termination Verification Approval	yes	yes
	• Building Site Plan Review and Approval	yes	yes
	• Drainage Discharge Permit	yes	yes

SOUTH STATION
EXPANSION

Appendix C-2 Site Specific Health and Safety Plan – Widett Circle Layover Facility

June 2016

massDOT
Massachusetts Department of Transportation

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Site Specific Health and Safety Plan – Widett Circle Layover Facility

TBD

Designated Health and Safety (H&S) Plan Writer

TBD

Designated Health and Safety (H&S) Plan Reviewer

TBD

Project Manager

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Attachment C – PPE Equipment Lists

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Attachment E – HASP Forms

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Forward

The following Health and Safety Plan (HASP) has been prepared in accordance with the Occupational Safety and Health Administration's (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard, 29 CFR 1910.120. This HASP is applicable to the future Phase II Environmental Site Assessment (ESA) activities planned for the Widett Circle site. At the time of preparation of this HASP, a Phase II ESA Scope of Work (SOW) has not been prepared for the site. Therefore, there are several sections of the following HASP that will require review once the Phase II ESA SOW is finalized. The sections requiring potential revisions are identified in the text of the HASP and include, but are not limited to, emergency contact information, job safety analyses, personnel exposure monitoring, and client specific health and safety (H&S) requirements.

1. Introduction

This HASP has been prepared for the Phase II ESA work planned for Widett Circle layover facility site located in Boston, Massachusetts. The work on this project will be carried out in compliance with Contractor's H&S Standards, and the Occupational Safety and Health Administration's (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) regulation. Specific H&S information for the project is contained in this HASP. All personnel working on hazardous operations or in the area of hazardous operations shall read and be familiar with this HASP before doing any work. All project personnel shall sign the certification page acknowledging that they have read and understand this HASP.

Changes in the scope of the project or introduction of new hazards to the project shall require revision of the HASP by the HASP writer and reviewer, and approval by the PM. The HASP Addendum Form and Log Table are included as Attachment A.

2. Emergency Contact Information and Procedures

Table 1 presents the Emergency Contact Information associated with the planned Phase II ESA work. List the appropriate Contractor PM, Contractor H&S Manager, and Client H&S Contact once they have been identified. The information in Table 1 should be revised, if necessary, upon review of the Phase II ESA SOW and prior to initializing the Phase II ESA activities.

Table 1 — Emergency Contact Information

Contact	Contact Information
Local Police – Boston Police	911 and 617-343-4730
MBTA Transit Police	617-222-1212
Local Ambulance – Boston Fire Department	911 and 617-343-3415
Local Fire Department – Boston Fire Department	911 and 617-343-3415
Local Hospital: Boston Medical Center	617-414-4075
Local Weather Data	Weather.com
Poison Control	800-332-3073
National Response Center (all spills in reportable quantities)	800-424-8802
U.S. Coast Guard (spills to water)	800-424-8802
Team PM	TBD
Team H&S Manager	TBD
Client H&S Contact	TBD

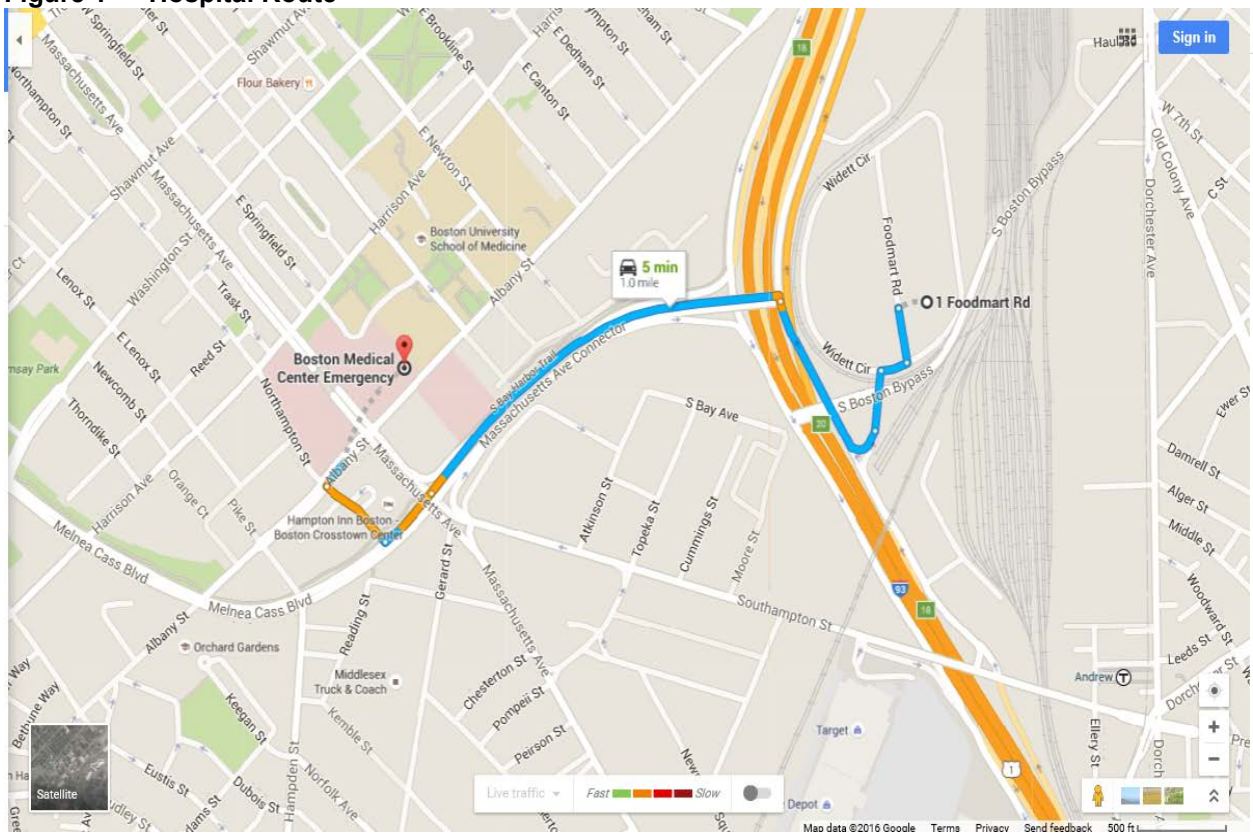
Table 2 presents the location of and directions to the nearest hospital with emergency medicine capabilities should transportation be required during the completion of the Phase II ESA work (see Figure 1). The information in Table 2 should be revised, if necessary, upon review of the Phase II SOW and prior to initializing the Phase II ESA activities.

Table 2 —Hospital Location and Directions

Medical Facility	Boston Medical Center
Address	751 Albany Street, Boston, MA 02111
Phone Number	617-636-5000

1. Take Foodmart Road and Access Rd to I-93 Frontage Road.
2. Head south on Foodmart Road toward Widett Circle.
3. Turn right onto Widett Circle.
4. Turn left onto Access Road.
5. Take Massachusetts Ave Connector to Northampton Street.
6. Sharp right onto I-93 Frontage Road.
7. Use the left 2 lanes to turn left onto Massachusetts Avenue Connector.
8. Continue onto Melnea Cass Boulevard.
9. Turn right onto Northampton Street.
10. Turn right onto Albany Street.
11. Destination will be on the right, Boston Medical Center, 759 Albany Street, Boston, MA 02118.

Figure 1 — Hospital Route



2.1 Emergency Notification Procedure for the Project

1. Dial 911 (if necessary).
2. Contact Project Manager (PM)/Task Manager (TM).
3. Contact Team H&S Coordinator.
4. Contact Client H&S and Safety Contact.

2.2 Emergency Supplies and Equipment List

Table 3 presents the appropriate Emergency Supplies and Equipment List for the planned Phase II ESA work. Select the appropriate supplies and equipment based on the proposed work. The information in Table 3 should be revised, if necessary, upon review of the Phase II SOW and prior to initializing the Phase II ESA activities.

Table 3 — Emergency Supplies and Equipment List

Emergency Supplies and Equipment (check all that apply)	Location on Project Site
☒ First Aid Kit (type):	TBD
☒ Fire Extinguisher	TBD
☒ Mobile Phone ☐ Satellite Phone	TBD
☒ Traffic Cones	TBD
☐ Walkie Talkies	
☐ Water or Other Fluid Replenishment	
☐ Eye Wash/Quick Drench Station	
☒ Eye Wash Bottle	TBD
☐ Wash and Dry Towelettes	
☐ Sunscreen (SPF 15 or higher)	
☐ Insect Repellant	
☒ Chemical Spill Kit	TBD
☐ *Other (specify):*	

3. Project and Site History Requirements

3.1 Site Background

The Widett Circle layover facility site is located in South Boston along the MBTA's Fairmount Line, approximately one track-mile from South Station. Cold storage facilities and food processing/storage industries have been at the site since initial development in the mid-1980s.

3.2 Site Description

The site is comprised of multiple parcels, primarily in private ownership: Cold Storage and Widett Circle. Cold Storage located at 100 Widett Circle, currently houses a temperature controlled food storage and distribution facility. The building has an active rail siding served by CSX Transportation, Inc. (CSXT). Widett Circle, located at 1 and 2 Foodmart Road, is made up of approximately 30 units leased to multiple businesses in the food processing, food storage, and food logistics industry.

1. LOT 1 Foodmart Road: One cold storage warehouse, one storage warehouse, multiple industrial offices and a restaurant. There is a freight elevator and a concrete loading dock in use at the property as well as a paved parking lot. The total gross area is 177,260 sf.
2. LOT 2 Foodmart Road: One cold storage warehouse, storage warehouse and multiple industrial offices. There is also a loading dock and paved parking area. The total gross area is 98,192 sf.

3. 100 Widett Circle and Foodmart Road: One building comprised of four cold storage warehouses owned by Americold with a cumulative area of 180,074 sf. Industrial offices, a freight elevator and a concrete loading dock are also part of the site. The total gross area is 192,008 sf.
4. Widett Circle and Foodmart Road: There are no property improvements for this section of land according to the Property Assessment card for 2015. This western portion of the parcel includes a portion of Amtrak's wet/dry tracks which are not a part of this investigation.
5. R W Fourth Street: There are no property improvements to this section according to the Property Assessment database for 2015.

Table 4 lists various site types which can have an effect on HASP requirements for the planned Phase II ESA work. Select the appropriate characteristics for the site.

Table 4 — Site Type (Check as many as applicable)

X	Active	X	Secure	X	Industrial		Landfill		Service station
	Inactive	X	Unsecured	X	Commercial		Well field		Water work
			Uncontrolled		Residential	X	Railroad		Undeveloped
Other specify:									

Based on the completion of a Phase I ESA, several potential Chemicals of Concern (COCs) were identified. These primary COCs include, but may not be limited to, those listed in Table 5.

Table 5 — Primary Chemicals of Concern

Known Compounds	Source (soil/water/drum, etc.)	Known Concentration Range (ppm, mg/kg, mg/l)	
		Lowest	Highest
Polychlorinated biphenyls (PCBs)	Soil	unknown	unknown
Volatile Petroleum Hydrocarbons	Soil/Water	unknown	unknown
Extractable Petroleum Hydrocarbons	Soil/Water	unknown	unknown
Volatile Organic Compounds	Soil/Water	unknown	unknown
Polyaromatic Hydrocarbons	Soil/Water	unknown	unknown
Metals	Soil	unknown	unknown

3.3 List of Project Tasks and Phase II Scope of Work

1. Task 1 – Subsurface Investigation: Prior to completion of the subsurface investigation activities, a ground penetrating radar survey will be completed.
2. Task 2 – Soil Sampling: A soil sampling program will be conducted to determine the extent of potential impacts at the site. Samples will be obtained via Geoprobe® sampling techniques. Specific safety issues related to Geoprobe or other drilling techniques will be addressed in the Job Safety Analysis (JSA), a sample of which can be found in Attachment B.
3. Task 3 – Groundwater Sampling: An evaluation of the groundwater conditions at the site will include the surveying, gauging and sampling of monitor wells.

4. Contractor Organization and Responsibilities

4.1 All Personnel

Each person is responsible for completing tasks safely, and reporting any unsafe acts or conditions to their supervisor. No person may work in a manner which conflicts with these procedures. Prior to initiating site activities, all Contractor and subcontractor personnel will receive training in accordance with applicable regulations, and be familiar with the requirements and standards referenced in this HASP. In addition, all personnel will attend daily safety meetings (tailgate meetings) to discuss site-specific hazards prior to beginning each day's work. Every Contractor employee, subcontractor, and client representative at the Site has the responsibility and authority to **Stop Work** of a coworker or subcontractor if the working conditions or behaviors are considered unsafe by them. When a **Stop Work** occurs, a review of the concerns should be conducted by the crew involved. Should the crew involved not be able to address the **Stop Work** concerns, the Site Safety Officer should be notified to review the conditions. There is no required period of down time for a **Stop Work** and work can commence once the conditions have been reviewed and addressed if necessary.

4.2 Project Manager/Task Manager

The PM is responsible for verifying that project activities are completed in accordance with the requirements of this HASP. The TM is the person generally responsible for the implementation of the field activities and safety on the project site. The PM is responsible for verifying that project activities are completed in accordance with the requirements of this HASP. The PM is responsible for confirming that the project has the equipment, materials, and qualified personnel to fully implement the safety requirements of this HASP, and/or that subcontractors assigned to this project, meet the requirements established by the Contractor. It is also the responsibility of the PM to:

- Review all applicable H&S Standards, and ensure that project activities conform to all requirements;
- Obtain client-specific H&S information and communicate with the client on H&S issues;
- Communicate with the Site Safety Officer (SSO) on H&S issues;
- Allocate resources for correction of identified unsafe work conditions;
- Ensure the Contractor's site workers have all training necessary for the project; and
- Report all injuries, illnesses and near-misses to the client representative, lead incident investigations, and ensure that any recommendations made are implemented.

4.3 Site Safety Officer

The SSO has overall responsibility for the technical H&S aspects of the project. Inquiries regarding the Contractor's H&S standards, project procedures, and other technical or regulatory issues should be addressed to this individual. It is also the responsibility of the SSO to:

- Review and work in accordance with the components of this HASP;
- Ensure that this HASP is available to and reviewed by all site personnel including subcontractors;
- Ensure that necessary site-specific training is performed (both initial and "tailgate" safety briefings);
- Ensure site visitors have been informed of the hazards related to the Contractors work;
- Ensure that work is performed in a safe manner and has authority to stop work when necessary to protect workers and/or the public;

- Coordinate activities during emergency situations;
- Ensure that all necessary permits and safety information provided by the client is disseminated to other site personnel and is maintained in an organized manner;
- Communicate with the PM on H&S issues;
- Report all injuries, illnesses and near-misses to the PM;
- Ensure that necessary safety equipment is maintained and used at the site; and
- Contact a H&S professional for assistance in establishing the respiratory cartridge change schedule as required.

An individual can act as more than one role, PM, TM, and/or SSO, during field activities.

5. Project Hazards and Control Measures

5.1 Hazard Analysis

The hazards in Table 6 below must be ranked using HIGH (H), MEDIUM (M) or LOW (L) based on Figure 2 and current site knowledge. For hazards that are not applicable, leave blank. Use the results of this analysis to verify that controls in the Job Safety Analysis (JSA) or other supporting documents are adequate to mitigate task hazards. When in the field, use the Tailgate Safety Meeting Form for task specific evaluation of task hazards.

Table 6 provides various potential hazardous associated with the site, seasonal conditions, and proposed activities for the planned Phase II ESA work. Select the appropriate hazards and the appropriate severity based on the probability and severity the risks based on the proposed work. The information in Table 6 should be revised, if necessary, upon review of the Phase II SOW and prior to initializing the Phase II ESA activities.

Table 6 should be reviewed and approved by the SSO at least every six months or any time site conditions or activities change from the original scope of work associated with this HASP.

Figure 2 — Hazard Ranking Chart

Severity	Consequence		Probability				
	Property Damage	Injury	Frequent	Likely	Occasional	Seldom	Unlikely
	> $100,000	Fatality	H	H	H	H	M
	> $10,000	Injury Requiring Hospitalization	H	H	H	M	L
	> $1000	Injury Requiring Medical Treatment Beyond First Aid	H	M	M	L	L
	< $1000	Injury Requiring First Aid	M	L	L	L	L

Table 6 - Hazard Rankings

Biological		Mechanical		Chemical/Radiation	
L	Biting/stinging insects	L	Cuts on equipment/tools		
L	Biting animals	M	Pinch points on equipment	L	General
L	Poisonous plants		Burns from equipment	H	Dusts, toxic
L	Phys. damaging plants	L	Struck by equipment	L	Dusts, nuisance
				L	Chemicals, Contractor use
Driving		Motion		L	Chemicals, corrosive
L	Night driving	L	Lifting/awkward body positions		Chemicals, explosive
M	Off-road driving	H	Struck by vehicle/traffic		Chemicals, flammable
L	Urban driving				Chemicals, oxidizing
	All-terrain vehicle	Personal Safety		M	Chemicals, toxic
	Boat		Working late/night		Chemicals, reactive
			Working alone		Radiation, ionizing
Electrical			High crime area		Radiation, non-ionizing
	Wet environments				
L	Electrical panels	Pressure		Compound Specific	
L	Electric utilities	M	Utilities (gas, water, etc.)	M	Asbestos
	Electric power tools		Compressed gas cylinders	L	Benzene
			Compressed air/aerosols		Cadmium
Environment		M	Hydraulic systems		Hydrogen sulfide
L	Heat			M	Lead
L	Cold	Sound			Silica
	Lightning	L	Equipment noise		
	Inclement weather		Tool noise	Gravity	
	High wind	L	Traffic noise (vehicle/train/etc.)	M	Slip, trip, fall
					Fall from height
					Ladders or scaffolds
					Struck by falling object

5.2 Job Safety Analyses, Health and Safety Standards, and Personal Protective Equipment

Site specific Job Safety Analyses (JSAs) will be completed for each safety critical task. An example is included in Attachment B. Hazards identified in the table above will be addressed specifically in the JSAs as well as control methods to protect employees and property from hazards. The JSA must lists the type of personal protective equipment (PPE) required for the completion of the project.

- Level D protection is the minimum protection required. Appropriate Level D protective equipment may include: Gloves, coveralls, safety glasses, face shield, and chemical-resistant, steel-toe shoes.
- Level C protection is required when the concentration and type of airborne substances is known and the criteria for using air purifying respirators are met. Typical Level C equipment may include: full-face air purifying respirators, inner and outer chemical-resistant gloves, hard hat, escape mask, and disposable chemical-resistant outer boots.
- Level B protection is required under circumstances requiring the highest level of respiratory protection, with lesser level of skin protection. Examples of Level B protection include: positive pressure, full face-piece self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA; inner and outer chemical-resistant gloves; face shield; hooded chemical resistant clothing; coveralls; and outer chemical-resistant boots.
- Level A protection is required when the greatest potential for exposure to hazards exists, and when the greatest level of skin, respiratory, and eye protection is required. Examples of Level A clothing

and equipment include: positive pressure, full face-piece SCBA or positive pressure supplied air respirator with escape SCBA; totally encapsulated chemical- and vapor-protective suit; inner and outer chemical-resistant gloves; and disposable protective suit, gloves, and boots.

A detailed list of PPE for the project is located in Attachment C.

Items for which the Contractor should have H&S Standards for this project are listed below. These standards should be reviewed by the PM, TM and site personnel. Prior to initializing the Phase II ESA SOW the potential for client specific JSAs, H&S standards, and PPE requirements need to be reviewed. The Client's H&S Contact should be contacted with any questions concerning the client specific standards, including:

- Utility Location;
- Drilling, Excavation and Trenching;
- Benzene;
- Asbestos;
- Polychlorinated biphenyls (PCBs); and/or
- Lead.

6. Hazard Communication

All project-required chemicals must be handled in accordance with the Contractor's Standard. The table below lists all chemicals that will be brought, used, and/or stored on the site by Contractor's and/or its subcontractors. Material Safety Data Sheets (MSDS) for chemicals brought on site are included in Attachment D. In Table 7 below, list the chemicals anticipated to be used by the Contractor on this project subject to Hazard Communication (HazCom) requirements. Modify quantities as needed.

Table 7 provides a list of various chemicals that may be used on site during the activities for the planned Phase II ESA work. Select the appropriate on-site chemicals based on the proposed work and the expected quantities to be onsite. The information in Table 7 should be revised, if necessary, upon review of the Phase II SOW and prior to initializing the Phase II ESA activities. This list should be updated when any new chemicals are brought to the site and reviewed every six months during the project to ensure its accuracy.

Table 7 — On-Site Chemicals

	Acids/Bases	Qty.		Decontamination	Qty.		Calibration	Qty.
☐	Not applicable		☐	Not applicable		☐	Not applicable	
☐	Hydrochloric acid		☐	Alconox		☐	Isobutylene/air	
☐	Nitric acid		☐	Liquinox		☐	Methane/air	
☐	Sulfuric acid		☐	Acetone		☐	Pentane/air	
☐	Sodium hydroxide		☐	Methanol		☐	Hydrogen/air	
☐	Zinc acetate		☐	Hexane		☐	Propane/air	
☐	Ascorbic acid		☐	Isopropyl alcohol		☐	Hydrogen sulfide/air	
☐	Acetic acid		☐	Nitric acid		☐	Carbon monoxide/air	
☐	Other:		☐	Other:		☐	pH standards (4,7,10)	
						☐	Conductivity standards	
						☐	Other:	

	Fuels	Qty.		Kits	Qty.			
☐	Not applicable		☐	Not applicable				
☐	Gasoline		☐	Hach			Specify:	
☐	Diesel		☐	DTECH			Specify:	
☐	Kerosene		☐	EPA 5035 Soil			Specify:	
☐	Propane		☐	Other:				
☐	Other:							
	Remediation	**Qty.**					**Other:**	**Qty.**
☐	Not applicable					☐	Not applicable	
☐	Other:					☐	Spray paint	
☐	Other:					☐	WD-40	
☐	Other:					☐	Pipe cement	
☐	Other:					☐	Pipe primer	
☐	Other:					☐	Mineral spirits	

7. Chemical Hazards

As required, air monitoring will be conducted and as outlined in this HASP to collect exposure data for COCs or for chemicals brought onsite for use. Table 8 lists the properties of chemicals that will be encountered at the site.

Table 8 — Chemical Hazard Information

Chemical Name	IP (eV)	Routes of Entry/ Exposure Symptoms	8-hr TWA[a] (ppm)	IDLH[b] (NIOSH) (ppm)	STEL (ppm)	Source TLV/PEL
Lead		inhalation	.05 mg/m^3	100 mg /m^3 (as Pb)	Not Listed	.05 mg/m^3

NA - not applicable

[a] The Threshold Limit Value (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH) is listed unless the Permissible Exposure Limit (PEL), designated by OSHA, is lower.

[b] Immediately Dangerous To Life or Health (IDLH) per the National Institute for Occupational Safety and Health (NIOSH).

See Section 9 for information on air monitoring requirements.

8. Tailgate Meetings

Tailgate safety briefings must be conducted at least once daily and should be conducted twice daily (at the start of the job and after midday meal break), or as tasks/hazards change. Each tailgate safety briefing must be documented on the form included in Attachment E and maintained with the project files. The tailgate safety briefing will serve as a final review for JSAs, hazard identification and controls to be utilized.

9. Personal Exposure Monitoring and Respiratory Protection

This section has been provided should personal exposure monitoring and respiratory protection be required. Based on the final Phase II SOW, the Team H&S Manager will determine the necessity of this section. This determination is to be conducted prior to implementing the Phase II ESA SOW.

Personal and area exposure monitoring will be documented on the Real Time Exposure Monitoring Data Form provided in Attachment E. All monitoring equipment will be maintained and calibrated in accordance with manufacturer's recommendations. All pertinent monitoring data will be logged on the form and

maintained on site for the duration of project activities. Calibration of all monitoring equipment will be conducted daily and logged on the same form.

Table 9 lists exposure monitoring requirements and associated action levels for site exposure hazards (e.g. chemical, noise, radiation, etc.). Action levels have been developed for exposure monitoring with real-time air monitoring instruments as specified in the table. Air monitoring data will determine the required respiratory protection levels at the Site during scheduled intrusive activities. The action levels are based on sustained readings indicated by the instrument(s). Air monitoring will be performed and recorded at up to 30-minute intervals.

If elevated concentrations are indicated, the monitoring frequency will be increased, as appropriate. If sustained measurements are observed during this time, the following actions will be instituted, and the PM and Project H&S Manager will be notified. For purposes of this HASP, sustained readings are defined as the average airborne concentration maintained for a period of one (1) minute.

Table 9 — Exposure Monitoring Requirements

TASK 1 – Is exposure monitoring required for the completion of this task? ☐ YES ☐ NO
If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level	Required Action
TBD				

TASK 2 – Is exposure monitoring required for the completion of this task? ☐ YES ☐ NO
If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level	Required Action
TBD				

TASK 3 – Is exposure monitoring required for the completion of this task? ☐ YES ☐ NO
If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level	Required Action
TBD				

9.1 Respirator Cartridge Change Schedule

Respirators will be stored in clean containers (i.e., self-sealing bag) when not in use. If respirators are required to be worn based on the action levels established above, respirator cartridges will be replaced in accordance with the following change-out schedule provided in Table 10.

Table 10 — Respirator Cartridge Change Schedule

Type of Cartridge	Cartridge Change-out Schedule
Particulate (i.e., High Efficiency Particulate Air)	At least weekly or whenever the employee detects an increase in breathing resistance. This will occur as the filter becomes loaded with particulate matter.
Sorbent (i.e., organic vapor)	At the end of each day's use or sooner, if the respirator manufacturer change-out schedule software program dictates otherwise. The Project H&S Manager or the PM must be consulted regarding gas/vapor cartridge change-out schedule. This will be determined per the Contractors Respiratory Protection standard.

Personnel who wear air purifying respirators (APRs) must be trained in their use, must have successfully passed a qualitative respiratory fit test within the last 12 months, and must have medical clearance for APR use.

With the exception of protection against particulates[1], if the action plan outlined above calls for an upgrade to an air-purifying respirator (for protection against organic vapors and other gaseous chemicals), the following will apply:

- The respirator cartridge will be equipped with an end-of-service-life indicator (ESLI) certified by National Institute for Occupational Safety and Health (NIOSH) for the contaminant; or
- If there is no ESLI appropriate for a contaminant, the project will implement a change schedule for cartridges to ensure that they are changed before the end of their service life.

10. Medical Surveillance

Medical surveillance requirements are outlined in the Contractor Medical Monitoring Standard. All medical surveillance requirements as indicated must be completed and site personnel medically cleared before being permitted on the project site.

11. General Site Access and Control

The SSO will coordinate access and control security at the work site. As the work dictates, the SSO will establish a work area perimeter. The size of the perimeter will be based on the daily task activities and will be discussed with all project personnel during the tailgate meeting and then documented on the tailgate meeting form. Control zones for Level C or above, as described previously, will be demarcated by either visual or physical devices and will be monitored for effectiveness by the SSO.

Only authorized personnel will be allowed beyond the perimeter. Other site workers and visitors to the site should be kept out of the work site. If visitors need access to the site, the SSO will escort the visitor at all times. All visitors will log in and out with the SSO. The visitor log sheet is included in Attachment F.

[1] Cartridge Change Schedule is not necessary for cartridges used in the protection against particulates provided that the cartridges are changed out when there is a perceived resistance in breathing experienced by the user.

11.1 Sanitation at Temporary Workplaces

11.1.1 Potable Water

An adequate supply of potable water must be provided on the site. Portable containers used to dispense drinking water shall be capable of being tightly closed, and equipped with a tap. Water shall not be dipped from containers. Any container used to distribute drinking water shall be clearly marked as to the nature of its contents and not used for any other purpose. Where single service cups (to be used but once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.

Potable water is available at facilities on site.

11.1.2 Toilet Facilities

Under temporary field conditions, the SSO will make provisions so that no less than one toilet facility is available. Use of a nearby toilet facility is an acceptable arrangement for mobile crews having transportation readily available.

Restroom facilities are available on site.

12. Decontamination Control Zones and Procedures

This section has been provided should decontamination control zones and procedures for Level C or higher be required. Based on the final Phase II SOW, the Team H&S Manager will determine the necessity of this section and make appropriate revisions. This determination is to be conducted prior to implementing the Phase II ESA SOW.

The zones for Level C and above will be designated by traffic cones, barricades, signs, caution tape, or other means effective in identifying the different areas. The SSO will establish control boundaries for the exclusion zone, contamination reduction zone, and the support zone. The zones will be identified by the SSO during tailgate meetings and documented on the meeting form. Entrance and exit to the exclusion zone will only be through controlled access points established for each work area.

Table 11 presents the Level A and B decontamination procedures.

Table 11 — Level A/B Decontamination Steps

Level A Decontamination Steps		Level B Decontamination Steps	
EZ-1	Segregated Equipment Drop	EZ-1	Segregated Equipment Drop
EZ-2	Boot Cover and Glove Wash	EZ-2	Boot Cover and Glove Wash
EZ-3	Boot Cover and Glove Rinse	EZ-3	Boot Cover and Glove Rinse
EZ-4	Tape Removal	EZ-4	Tape Removal
EZ-5	Boot Cover Removal	EZ-5	Boot Cover Removal
EZ-6	Outer Glove Removal	EZ-6	Outer Glove Removal
CRZ-7	Suit/Safety Boot Wash	CRZ-7	Outer Glove Removal
CRZ-8	Suit/Safety Boot Rinse	CRZ-8	Suit/SCBA/Boot/Glove Rinse
CRZ-9	Encapsulated Suit Partial Removal/Tank Change	CRZ-9	Tank Change
CRZ-9a	Redress-return to EZ	CRZ-9a	Redress-return to EZ
CRZ-10	Safety Boot Removal	CRZ-10	Safety Boot Removal
CRZ-11	Encapsulated Suit Removal	CRZ-11	SCBA Removal
CRZ-12	SCBA Removal	CRZ-12	Splash Suit Removal
CRZ-13	Inner Glove Wash	CRZ-13	Inner Glove Wash
CRZ-14	Inner Glove Rinse	CRZ-14	Inner Glove Rinse
CRZ-15	Face-piece Removal	CRZ-15	Face-piece Removal
CRZ-16	Inner Glove Removal	CRZ-16	Inner Glove Removal
CRZ-17	Inner Clothing Removal	CRZ-17	Inner Clothing Removal
SZ-18	Field Wash	SZ-18	Field Wash
SZ-19	Redress	SZ-19	Redress

Zones include:

- EZ-Exclusion Zone – The area of investigation or contamination. No personnel allowed unless appropriate PPE is worn;
- CRZ-Contamination Reduction Zone – The transition area of between contaminated areas and the support zone. Decontamination activities are conducted here; and
- SZ-Support Zone – Non-contaminated areas outside the work zone.

13. Emergency Action Plan (EAP)

An Emergency Action Plan (EAP) will be prepared and approved by the SSO. The EAP will be included in Attachment G. The EAP details the procedures to take in the event that an injury, over-exposure or spill has occurred. The EAP must be approved by the SSO and reviewed by site personnel working under this HASP. All employees working on this project must be shown the location and proper use of all emergency equipment prior to beginning work on the project.

14. Client-Specific Health and Safety Requirements

Prior to implementing the Phase II ESA, the Team H&S Manager should verify that the client does not have specific H&S requirements that apply to the proposed work. If the client has requirements they should be listed and defined in this section, otherwise thus section can be removed.

Contractor project personnel must comply with the client's specific H&S requirements at all times. Client-specific H&S requirements are as follows:

- (list requirements here)

15. Ground or Air Shipments of Hazardous Materials

All samples, electronic equipment with batteries, powders, gases, liquids, magnetized materials or radioactive materials being shipped by air or ground transport will be evaluated using the appropriate Shipping Determination process to determine if the material or equipment being shipped is hazardous for transport. All materials identified as hazardous materials (HazMat) will be shipped according to applicable MassDOT and International Air Transport Association (IATA) regulations and requirements as prescribed by the Contractor DOT Program.

All employees collecting samples, preparing HazMat packages, or offering HazMat to a 3rd-party carrier such as FedEx will have current HazMat training.

16. H&S Orientation and Task Improvement Process

As part of any project, no matter how simple or complex, Task Improvement Processes (TIPs) should be conducted when practical and when able to integrate into normal business activities. TIPs should be scheduled based on the risk of the tasks being performed, and should be conducted for different tasks and at different times. Completion of TIPs should be documented on the tailgate meeting form. The following table should be filled out upon completion of TIPs conducted on this project.

Table 12 — TIP Plan

Identified Task for TIP	Schedule Date	Observer Name	Observee Name	Feedback Supervisor Name

17. Subcontractors

A copy of this HASP is to be provided to all subcontractors prior to the start of work so that the subcontractor is informed of the hazards at the site. While the Contractor HASP will be the minimum H&S requirements for the work completed by Contractor and its subcontractors, each subcontractor, in coordination with Contractor H&S personnel, is expected to perform its operations in accordance with its own HASP, policies and procedures unique to the subcontractor's work to ensure that hazards associated with the performance of the work activities are properly controlled. Copies of any required safety documentation for a subcontractor's work activities will be provided to Contractor for review prior to the start of on-site activities.

In the event that the subcontractor's procedures/requirements conflict with requirements specified in this HASP, the more stringent guidance will be adopted after discussion and agreement between the subcontractor and Contractor project H&S personnel. Hazards not listed in this HASP, but known to the subcontractor or known to be associated with the subcontractor's services, must be identified and addressed to the Contractor project or TM and SSO prior to beginning work operations.

Should Subcontractors working at the site choose to utilize this HASP they will need to have this plan with them, and will also need to sign the Subcontractor HASP receipt signature page of the Contractor HASP

(Attachment H). Subcontractors are responsible for the health and safety of their employees at all times, and have the authority to **Stop Work** if unsafe conditions arise.

The PM/TM and SSO (or authorized representative) has the authority to halt the subcontractor's operations and to remove the subcontractor or subcontractor's employee(s) from the site for failure to comply with established H&S procedures or for operating in an unsafe manner.

18. Project Personnel HASP Certification

All site project personnel will sign the certification signature page provided in Attachment H of this HASP.

19. Roadway Work Zone Safety

All project work performed in a public or private roadway, regardless of work duration, will require a either a written Traffic Control Plan (TCP) or a Construction Management Plan (CMP). Projects having work activities on both public and private roadways will operate under a TCP approved by an employee designated with Engineering Judgment. A site specific TCP and/or CMP have been prepared for the site and work conducted as part of the Phase II Scope of Work will conform to them.

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Attachment A – Health and Safety Plan (HASP) Addendum and Log Table

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Addendum Page

This form should be completed for new tasks associated with the project. The PM and/or TM should revise the Project Hazard Analysis Worksheet with the new task information and attach to this addendum sheet. JSAs should be developed for any new tasks and attached as well.

Review the addendum with all site staff, including subcontractors, during the daily tailgate briefing, and complete the tailgate briefing form as required. Attach a copy of the addendum to all copies of the HASP including the site copy, and log in the Addendum Log Table A-1 on the next page.

Addendum Number: _____ Project Number: _____

Date of Changed Conditions: _____ Date of Addendum: _____

Description of Change that Results in Modifications to HASP:

Signed: _____ Signed: _____
Project Manager Site Safety Officer

Signed: _____ Signed: _____
H&S Plan Writer H&S Plan Reviewer

Addendum Log Table

Addendums are to be added to every copy of the HASP, and logged on Table A-1 to verify that all copies of the HASP are current:

Table A1- Addendum Log Table

Addendum Number	Date of Addendum	Reason for Addendum	Person Completing Addendum
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Attachment B – Job Safety Analysis (JSAs)

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Table B1 - Job Safety Analysis - EXAMPLE

General

JSA ID		**Status**	
Job Name	Environment-Drilling, soil sampling, well installation	**Created Date**	
Task Description	Drilling, soil sampling, and well installation	**Completed Date**	
Template			

Client / Project

Client	
Project Number	
Project Name	
Team PM	
Team Health and Safety Manager	

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer					
HASP Reviewer					

Table B2 - Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Set up necessary traffic and public access controls	1	Struck by vehicle due to improper traffic controls	Use a buddy system for placing site control cones and/or signage. Position vehicle so that you are protected from moving traffic. Wear Class II traffic vest	
2	Utility Clearance	1	Potential to encounter underground or above ground utilities while drilling.	Complete utility clearance in accordance with the Contractor Utility Clearance H&S Standard.	
3	General drill rig operation	1	Excessive noise is generated by rig operation.	When the engine is used at high RPMs or soil samples are being collected, use hearing protection.	
		2	During drill rig operation, surfaces will become hot and cause burns if touched, and COCs in the soils more readily vaporize generating airborne contaminates.	Due to friction and lack of a drilling fluid, heat will be produced during this method. Mainly drill augers. Be careful handling split spoons. Wear proper work gloves. When soils and parts become heated, the COC could volatilize. Air monitoring should always be performed in accordance with the HASP.	
		3	Moving parts of the drilling rig can pull you in causing injury. Pinch points on the rig and auger connections can cause pinching or crushing of body parts.	Stay at least 5 feet away from moving parts of the drill rig. Know where the kill switch is, and have the drillers test it to verify that it is working. Do not wear loose clothing, and tie long hair back. Avoid wearing jewelry while drilling. Cone off the work area to keep general public away from the drilling rig.	
		4	Dust and debris can cause eye injury and soil cuttings and/or water could contain COCs.	Wear safety glasses and stay as far away from actual drilling operation as practicable. Wear appropriate gloves to protect from COCs.	
		5	Drilling equipment laying on the ground (i.e. augers, split spoons, decon equipment, coolers, etc.), create a tripping hazard. Water from decon buckets generate mud and cause a slipping hazard.	Keep equipment and trash picked up, and store away from the primary work area.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		6	The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Clearance H&S Standard for guidance.	
4	Mudd rotary drilling	1	The raised derrick can strike overhead utilities, tree limbs or other elevated items.	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
		2	This technology uses fluid, which collects with sediments in large basin. Fluid can splash out and cause slipping/mud hazard. Liquid mixture can splash into your eyes.	Wear rubber boots if needed, and keep clear of muddy/wet area as much as practicable. If area becomes excessively muddy, consider mud spikes or covering the area with a material that improves traction. Wear safety glasses.	
5	Hollow stem auger drilling	1	All hazards in step 3 apply. Additionally, the raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
		2	Hands or fingers can get caught and crushed if trying to clean by hand or with tools while the auger is still turning.	Auger should always be stopped and clutch disengaged prior to cleaning.	
6	Air Rotary Drilling	1	This drilling method works with high air pressure and can generate flying debris that can strike your body or get in your eyes.	When the drill rig is being driven into media, it will produce flying debris. The flaps behind the drill rig should stay closed whenever possible to reduce the risk of flying debris. Safety glasses and hard hat should always be worn when the drill rig is operating. When penetrating asphalt, protect surrounding cars that may be present to avoid damage to pain or windshields.	
		2	The raise derrick can strike overhead utilities, tree limbs or other elevated items.	Never move this rig with the derrick up. Ensure there is proper clearance to raise the derrick and that you are far enough away from overhead power lines. See the Utility clearance H&S Standard for guidance.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		3	When drilling through bedrock prior to groundwater, dust can be produced from pulverization. Inhalation of dusts/powder can occur.	Supplemental water should be used to manage dust and/or dust masks should be used if necessary.	
7	Reverse rotary drilling	1	This method will use fresh water to pump out drill cuttings through the center of the casing. Water/sediment mixture is generated and could cause contact with impacted soils or groundwater.	Ensure the pit construction can hold the amount of cuttings that are anticipated. Air monitoring should also be used of pit area.	
		2	Fire hydrants are often used for water source. Hydrants deliver water at high pressure. Pressurized water can cause flying parts/debris and excessive slipping hazards.	Water usage from fire hydrants should be cleared with local municipalities prior to use. Only persons that know how to use the hydrant should be performing this task. Ensure all connections are tight, and hose line is not run over to cut by traffic. Any leaks from the hydrant should be reported immediately.	
		3	Settling pit construction can cause tripping hazard from excavated soils, and plastic sheeting can cause slipping.	Cone off the area to keep the general public/visitors away from the settling pit. Ensure proper sloping of excavation.	
		4	The raised derrick can strike overhead utilities, tree limbs or other elevated items.	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
8	Rotosonic drilling	1	Fire hydrants are often used for water source. Hydrants deliver water at high pressure. Pressurized water can cause flying parts/debris and excessive slipping hazards.	Water usage from fire hydrants should be cleared with local municipalities prior to use. Only persons that know how to use the hydrant should be performing this task. Ensure all connections are tight, and hose line is not run over to cut by traffic. Any leaks from the hydrant should be reported immediately.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		2	This method requires a lot of clearance. The drill head can turn 90 degrees to attach to the next drill flight or casing. This usually requires a large support truck to park directly behind the rig. As the drill head raises the new casing flight is angled down at the same time until it can be turned completely vertical.	Ensure sufficient overhead clearance.	
		3	Heavy lifting of cores can cause muscle strain.	Always use 2 people to move core containers. Use caution moving core samples to layout area. Plan layout area to ensure adequate aisle space between core runs for logging. Keep back straight and use job rotation.	
		4	The rotosonic drill head can move very quickly up and down while working on a borehole. Moving parts can strike someone or catch body parts.	The operator and helper must communicate and stay clear of the path of the drill head. The drill utilizes two large hydraulic clamps to continuously hold casings while load/unloading previous casings. Do not wear loose clothing.	
9	Direct push drilling	1	The drill rods will be handled by workers most of the time rather than the rig doing it, therefore pinch points can cause lacerations and crushing of fingers/body parts.	Keep a minimum of 5 feet away from drill rig operation and moving parts.	
		2	The direct push rigs are usually meant to fit in spaces where larger rig can't. Tight spaces can pin workers.	Do not put yourself between the rig and a fixed object. Use Spotters or a tape measure to ensure clearances in tight areas. Pre-plan equipment movement from one location to the next.	
		3	Some direct push equipment is controlled by wireless devices. These controls can fail and equipment can strike workers or cause damage to property.	The drill rig should be used in a large open area to test wireless controls prior to moving to boring locations. The operator of the rig will test the kill switch with wireless remote prior to use. Operator will stay in range of rig while moving so that wireless signal will not be too weak and cause errors to the controls.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		4	Sampling sleeves must be cut to obtain access to soil. Cutting can cause lacerations.	It's preferable to let the driller cut the sleeves open. Many drillers have holders for the sleeve to allow for stability when cutting. If you cut the sleeves, use a hook blade, change blade regularly, and cut away from the body.	
		5	Soil cores may contain contaminated media.	Wear nitrile gloves and safety glasses for protection from contaminated media when logging soil borings.	
10	Rock coring	1	Flying debris can hit workers or cause debris to get in eyes.	Rock chips or overburden may become airborne from drilling method. Wear safety glasses and hard hat and remain at a safe distance from back of drill rig.	
		2	Heavy lifting of cores can cause muscle strain.	Always use 2 people to move core containers. Use caution moving core samples to layout area. Plan layout area to ensure adequate aisle space between core runs for logging. Keep back straight and use job rotation.	
11	Sample collection and processing	1	Injuries can result from pinch points on sampling equipment, and from breakage of sample containers.	Care should be taken when opening sampling equipment. Look at empty containers before picking them up, and do not over-tighten container caps. Use dividers to store containers in the cooler so they do not break.	Sample Cooler Handling JSA
		2	Lifting heavy coolers can cause back injuries.	Use two people to move heavy coolers. Use proper lifting techniques.	
12	Monitoring well installation	1	Same hazards as in Step 3 with general drill rig operation	See step 3	
		2	Monitoring well construction materials can clutter the work area causing tripping hazards.	Well construction materials should be picked up during the well installation process.	
		3	Heavy lifting can cause muscle strains, and cutting open bags can cause lacerations.	Well construction materials are usually 50 lbs or greater. Team lift or use drill rig to hoist bags. Always use work gloves while cutting open bags.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		4	Well pack material (i.e. sand, grout, bentonite) can become airborne and get in your eyes.	Wear safety glasses for protection from airborne sand and dust.	
		5	Cutting the top of the well to size can cause jagged/sharp edges on the top of the well casing.	Wear gloves when working with the top of the well casing, and file any sharp jagged edges that resulted from cutting to size.	
13	Soil cutting and purge water management	1	Moving full drums can cause back injury, or pinching/crushing injury.	Preferably have the drilling contractor move full drums with their equipment. If this is not practicable, use lift assist devices such as drum dollies, lift gates, etc. Employ proper lifting techniques and identify pinch/crush points. Wear leather work gloves, and clear all walking and work areas of debris prior to moving a drum.	Drum Handling JSA

Table B3 - PPE Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)	leather	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Required
Miscellaneous PPE	traffic vest--Class II or III		Required
Respiratory Protection	dust mask		Recommended

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)	Driller to provide and manage	Recommended
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
Personal	eye wash (specify type)	bottle	Required
	water/fluid replacement		Recommended
Traffic Control	traffic cones		Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**		

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Attachment C – PPE Equipment Lists

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Table C1 - PPE Checklist

R = Equipment required to be present on the site. **O** = Optional equipment. Subcontractors must have the same equipment listed here as a minimum.

Description (Put Specific Material or Type in Box)	Level Of Protection		
	D	C	B
Body			
Coveralls			
Chemical Protective Suit (include type in cell, e.g., Tyvek, Saranex, PVC, etc.)			
Splash Apron			
Rain Suit			
Traffic Safety Vest (reflective)			
Head			
Hard Hat (if does not create other hazard)			
Head Warmer (depends on temperature and weather conditions)			
Eyes & Face			
Safety Glasses (incorporate sun protection as necessary)			
Goggles (based on hazard)			
Splash Guard (based on hazard)			
Ears			
Ear Plugs			
Ear Muffs			
Hands and Arms			
Outer Chemical Resistant Gloves (specify the type of glove based on chemical hazard)			
Inner Chemical Resistant Gloves (specify the type of glove based on chemical hazard)			
Insulated Gloves			
Work Gloves*			
Foot			
Safety Boots (steel toe and shank)			
Rubber, Chemical Resistant Boots			
Rubber Boots			
Disposable Boot Covers			
Respiratory Protection			
1/2 Mask APR			
Full Face APR			
Dust Protection			
Powered APR			
SCBA			
Air Line			

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Attachment D – Material Safety Data Sheets (MSDSs)

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Material Safety Data Sheets should be added once the Phase II Environmental Site Assessment Scope of Work has been defined.

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Attachment E – Health and Safety Plan (HASP) Forms

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Form E1 – Tailgate Health and Safety Meeting Form

TAILGATE HEALTH & SAFETY MEETING FORM

This form documents the tailgate meeting conducted in accordance with the Project HASP. Personnel who perform work operations on-site during the day are required to attend this meeting and to acknowledge their attendance, at least daily.

Project Name:			**Project Location:**
Date:	**Time:**	**Conducted by:**	**Signature/Title:**
Client:		**Client Contact:**	**Subcontractor companies:**

TRACKing the Tailgate Meeting

Think through the Tasks (list the tasks for the day):

1 _____ 3 _____ 5 _____

2 _____ 4 _____ 6 _____

Other Hazardous Activities - Check the box if there are any other ARCADIS, Client or other party activities that may pose hazards to ARCADIS operations ☐ If there are none, write "None" here: _____

If yes, describe them here: _____

How will they be controlled? _____

Prework Authorization - check activities to be conducted that require permit issuance or completion of a checklist or similar before work begins:

	Doc #		Doc #		Doc #
☐ Not applicable		☐ Working at Height		☐ Confined Space	
☐ Energy Isolation (LOTO)		☐ Excavation/Trenching		☐ Hot Work	
☐ Mechanical Lifting Ops		☐ Overhead & Buried Utilities		☐ Other permit	

Discuss following questions (for some review previous day's post activities). **Check if yes :**

☐ Topics from Corp H&S to cover?		
☐ Incidents from day before to review?	☐ Lessons learned from the day before?	☐ Any Stop Work Interventions yesterday?
☐ Any corrective actions from yesterday?	☐ Will any work deviate from plan?	☐ If deviations, notify PM & client
☐ JLAs or procedures are available?	☐ Field teams to "dirty" JLAs, as needed?	☐ All equipment checked & OK?
☐ Staff has appropriate PPE?	☐ Staff knows Emergency Plan (EAP)?	☐ Staff knows gathering points?

Comments: _____

Recognize the hazards (check all those that are discussed) (Examples are provided) and **Assess** the Risks (Low, Medium, High - circle risk level) - Provide an overall assessment of hazards to be encountered today and briefly list them under the hazard category.

☐ Gravity (i.e., ladder, scaffold, trips) (L M H)	☐ Motion (i.e., traffic, moving water) (L M H)	☐ Mechanical (i.e., augers, motors) (L M H)
☐ Electrical (i.e., utilities, lightning) (L M H)	☐ Pressure (i.e., gas cylinders, wells) (L M H)	☐ Environment (i.e., heat, cold, ice) (L M H)
☐ Chemical (i.e., fuel, acid, paint) (L M H)	☐ Biological (i.e., ticks, poison ivy) (L M H)	☐ Radiation (i.e., alpha, sun, laser) (L M H)
☐ Sound (i.e., machinery, generators) (L M H)	☐ Personal (i.e. alone, night, not fit) (L M H)	☐ Driving (i.e. car, ATV, boat, dozer) (L M H)

Continue TRACK Process on Page 2

TAILGATE HEALTH & SAFETY MEETING FORM - Pg. 2

Control the hazards (Check all and discuss those methods to control the hazards that will be implemented for the day): Review the HASP, applicable JLAs, and other control processes. Discuss and document any additional control processes.

☒ **STOP WORK AUTHORITY** (Must be addressed in every Tailgate meeting - (*See statements below*)

☐ Elimination	☐ Substitution	☐ Isolation
☐ Engineering controls	☐ Administrative controls	☐ Monitoring
☐ General PPE Usage	☐ Hearing Conservation	☐ Respiratory Protection
☐ Personal Hygiene	☐ Exposure Guidelines	☐ Decon Procedures
☐ Emergency Action Plan (EAP)	☐ Fall Protection	☐ Work Zones/Site Control
☐ JLA to be developed/used *(specify)*	☐ LPO conducted *(specify job/JLA)*	☐ Traffic Control
☐	☐	☐ Other *(specify)*
☐	☐	☐

Signature and Certification Section - Site Staff and Visitors

Name/Company/Signature	Initial & Sign in Time	Initial & Sign out Time	I have read and understand the

Important Information and Numbers

All site staff should arrive fit for work. If not, they should report to the supervisor any restrictions or concerns.

In the event of an injury, employees will call WorkCare at 1.800.455.6155 and then notify the field supervisor who will, in turn, notify Corp H&S at 1.720.344.3844.

In the event of a motor vehicle accident, employees will notify the field supervisor who will then notify Corp H&S at 1.720.344.3844 and then Corp Legal at 1.720.344.3756.

In the event of a utility strike or other damage to property of a client or 3rd party, employees will immediately notify the field supervisor, who will then immediately notify Corp Legal at 1.678.373.9556 and Corp H&S at

Visitor Name/Co - not involved in work

	In	Out
	In	Out
	In	Out
	In	Out

I will STOP the job any time anyone is concerned or uncertain about health & safety or if anyone identifies a hazard or additional mitigation not recorded in the site, project, job or task hazard assessment.

I will be alert to any changes in personnel, conditions at the work site or hazards not covered by the original hazard assessments.

If it is necessary to **STOP THE JOB**, I will perform **TRACK**; and then amend the hazard assessments or the HASP as needed.

I will not assist a subcontractor or other party with their work unless it is absolutely necessary and then only after I have done TRACK and I have thoroughly controlled the hazard.

Post Daily Activities Review - Review at end of day or before next day's work (Check those applicable and explain:)

- ☐ Lessons learned and best practices learned today: _____
- ☐ Incidents that occurred today: _____
- ☐ Any Stop Work interventions today? _____
- ☐ Corrective/Preventive Actions needed for future work: _____
- ☐ Any other H&S issues: _____

Keep H&S 1st in all things

WorkCare - 1.800.455.6155

Form E2 – Real Time Exposure Monitoring Data Collection Form

Real Time Exposure Monitoring Data Collection Form

Document all air monitoring conducted on the Site below. Keep this form with the project file.

Site Name: _____ Date: _____

Instrument: _____ Model: _____ Serial #: _____

Calibration Method: (Material used settings, etc.)	
Calibration Results:	
Calibrated By:	

Activity Being Monitored	Compounds/Hazards Monitored	Time	Reading	Action Required? Y/N

Describe Any Actions Taken as a Result of this Air Monitoring and Why (does it match Table 5-1):

_____

_____

Form E3 – Hazardous Materials Transportation Form

Hazardous Materials Transportation Form

	Vehicle (place X in box)	Type (pick-up, car, box truck, etc.)
Personal		
Rental		
ARCADIS owned/leased		
Government owned		
Trailer		

Materials Transported	Quantity	Storage/Transport Container

List Trained Drivers:

_____

_____

Form E4 – Hazardous Material Shipment Form

Hazardous Materials Shipment Form

Material Description and Proper Shipping Name (per DOT or IATA)	Shipment Quantity	DOT Hazard Classification	Shipment Method (air/ground)

List Shipper (i.e., who we are offering the shipment to):

_____

_____

List Trained Employee(s):

_____

_____

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Attachment F – Visitor Acknowledgement and Acceptance

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Form F1 - Visitor Acknowledgement and Acceptance of HASP Signature Form

By signing below, I waive, release and discharge the owner of the site and Contractor and their employees from any future claims for bodily and personal injuries which may result from my presence at, entering, or leaving the site and in any way arising from or related to any and all known and unknown conditions on the site.

Name	Company	Reason for Visit	Date/Time On Site	Date/Time Off Site

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Attachment G – Emergency Action Plan

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Attachment H – Employee and Subcontractor Signature Form

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Form H1 - Employee Signature Form

I certify that I have read, understand, and will abide by the safety requirements outlined in this HASP.

Printed Name	Signature	Date

Form H2 - Subcontractor Acknowledgement: Receipt of HASP Signature Form

Contractor claims no responsibility for the use of this HASP by others although subcontractors working at the site may use this HASP as a guidance document. In any event, Contractor does not guarantee the health and/or safety of any person entering this site. Strict adherence to the H&S guidelines provided herein will reduce, but not eliminate, the potential for injury at this site. To this end, health and safety becomes the inherent responsibility of personnel working at the site.

Printed Name	Company	Signature	Date

Attachment I – 2016 Traffic Control Plan and Construction Management Plan

(Sample shown – to be replaced with actual TCP or CMP)

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Form I1 – Traffic Control Plan/Site Traffic Awareness and Response Plan

Traffic Control Plan/Site Traffic Awareness and Response Plan
Revision 8, 10/15/2015

1.0 General

Plan type	Select
Project Name:	
Project Number:	
Developer Name:	
Not Applicable	
Not Applicable	
Not Applicable	
Not Applicable	
Not Applicable	
Not Applicable	

Comments:

2.0 Work Description

Provide a brief description of scope of work:

3.0 Type and Duration

Work locations on this project will be: Select

Special traffic conditions may include (select most prevalent): Not applicable

4.0 Traffic Control Layout, Number of Devices Required and Phasing

The following pedestrian requirements in the Field Guide to RWZ Safety applies:

Select the traffic control devices to be used and enter number each required:

Check all that apply:	*Wording or Pictogram*	*Number:*
☐ Warning signs	_____	_____
☐ Warning signs	_____	_____
☐ Warning signs	_____	_____
☐ Stop/Slow paddle		_____
☐ Red flag		_____
☐ Drums		_____
☐ Channelizer cone (42 inch height, 10 lb base)		_____
☐ Channelizer cone (42 inch height, 30 lb base)		_____
☐ Traffic cones (≥ 18 inches tall)		_____
☐ Barricade ☐ Type I ☐ Type II		_____
☐ Flags for cones		_____
☐ Lights (for night work)		_____
☐ Plastic fencing (rolls)		_____
☐ Caution tape (rolls)		_____
☐ Other (specify):		_____
_____		_____
_____		_____
_____		_____
_____		_____
_____		_____
_____		_____
_____		_____

5.0 Approvals

Plan Developer: _____

HASP Reviewer _____

Chapter 3 – Environmental Analyses

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3. ENVIRONMENTAL ANALYSES

3.1. Introduction

The Draft Environmental Impact Report (DEIR) provided a complete description and analysis of the project and its alternatives. It includes a description of existing conditions and identification and analysis of potential impacts related to the physical, biological, chemical, economic, and social conditions of the project site, its immediate surroundings, and the region. It also provides a discussion of the project's consistency with regulations pertaining to each area of potential impact. The project website provides links to the full DEIR document. Hyperlinks to each DEIR section are also provided in Appendix H, *DEIR Web Links*.

This FEIR chapter responds to the Secretary's Certificate by providing additional analyses of wetlands impacts; water quality and stormwater impacts; water use and wastewater impacts; climate change impacts; greenhouse gas impacts; and site contamination and hazardous materials. Proposed mitigation to avoid, reduce and/or minimize all impacts is discussed in this chapter as well. This FEIR chapter also summarizes environmental impacts identified in the DEIR related to the following:

- Land use and property
- Wetlands
- Chapter 91 waterways and tidelands
- Water quality and stormwater
- Water use and wastewater
- Traffic and transportation
- Climate change adaptation
- Air quality
- Noise and vibration
- Greenhouse gas emissions
- Historic resources
- Site contamination and hazardous materials
- Construction impacts

3.2. Summary of Potential Environmental Impacts

Table 3-1 provides a summary of potential environmental impacts including permanent, temporary, and construction-related impacts from the proposed project. These impacts were compared to the effects of the No Build Alternative in the year 2035, except where otherwise noted. Mitigated impacts are also included where appropriate.

Table 3-1 — Summary of Potential Environmental Impacts

Environmental Impacts	South Station	Widett Circle	Readville – Yard 2
Land Use and Property	• Acquire United States Postal Service (USPS) property (approximately 14 acres). • Acquire parcel adjacent to 245 Summer Street to reopen Dorchester Avenue (approximately 0.2 acres). • Reopen Dorchester Avenue to public right-of-way.	• Acquire Cold Storage and New Boston Food Market properties (approximately 25.1 acres). • Acquire Widett Circle and Foodmart Road (approximately 6.2 acres). • Acquire a portion of Department of Public Works (DPW) facility at Broad Interlocking (0.1 acres)	• Partial acquisition of James G. Grant Co. LLC property (approximately 0.7 acres).
Wetlands	• Direct impact to approximately 2.9 acres of Land Subject to Coastal Storm Flowage (LSCSF). • Direct impact to approximately 700 linear feet of coastal bank • Direct impact to approximately 7.9 acres of coastal bank 100-foot buffer zone	• No wetland impacts.	• Direct impact to approximately 0.01 acres of Riverfront Area. • Direct impact to 0.3 acres of 100-foot buffer zone. • Direct impact to 0.6 acres of isolated vegetated wetlands.
Chapter 91 Waterways and Tidelands	• Removes the nonwater-dependent USPS facility from filled Commonwealth Tidelands. • Expands existing transportation infrastructure. • Reopens approximately 5.0 acres of filled tidelands to public access. • Provides approximately 0.5 miles of newly reopened public	• Not subject to Chapter 91.	• Not subject to Chapter 91.

Environmental Impacts	South Station	Widett Circle	Readville – Yard 2
	roadway. • Creates approximately 3.0 acres of pedestrian-oriented open space.		
Water Quality and Stormwater	• Reduces impervious cover by 7.3 acres. • Reduces peak flow rate and runoff volume to below pre-development conditions. • Provides stormwater recharge via a bioretention area. • Improves water quality by removing approximately 80% of total suspended solids (TSS).	• Reduces impervious cover by 14.7 acres. • Reduces peak flow rate and runoff volume to below pre-development conditions. • Would provide groundwater recharge if feasible. • Improves water quality by removing approximately 80% of TSS.	• Increases impervious cover by 2.0 acres. • Reduces peak flow rate and runoff volume to below pre-development conditions. • Would provide groundwater recharge if feasible. • Improves water quality by removing approximately 80% of TSS.
Water Supply and Wastewater	• Increases water use and wastewater generation by approximately 44% over existing conditions.	• Decreases water use and wastewater generation by approximately 55% over existing conditions.	• Increases water use and wastewater generation by approximately 80% over existing conditions.
Transportation	• Increases ridership by approximately 11% in 2025 and by approximately 13% in 2035. • Would meet the MBTA's Service Delivery Policy related to crowding impacts on rapid transit and local bus routes. • The Silver Line platform would experience a Daily pedestrian flow increase of 2% to 4% on Silver Line platforms and up to 6% on Red Line platforms.	• No ridership or transit capacity impacts.	• No ridership or transit capacity impacts.

Environmental Impacts	South Station	Widett Circle	Readville – Yard 2
Traffic	• Without mitigation, increases Level of Service (LOS) at one intersection and decreases LOS at three intersections; four are unchanged. With mitigation, LOS increases at seven intersections and LOS decreases at one intersection.	• No impact. Trip generation at layover site is minimal.	• No impact. Trip generation at layover site is minimal.
Climate Change Adaptation	• Raising the seawall will help mitigate flooding from projected 2 feet of sea level rise by the year 2050. • Subject to flooding from 1% annual chance flood (100-year) with 3.2 feet of sea level rise by the year 2070. • Subject to increasing incidence of extreme heat events.	• Subject to flooding from 1% annual chance flood with 3.2 feet of sea level rise by the year 2070. • Subject to increasing incidence of extreme heat events.	• Subject to increasing incidence of extreme heat events.
Air Quality	• No adverse air quality impacts expected as a result of the project.	• No adverse air quality impacts expected as a result of the project.	• No adverse air quality impacts expected as a result of the project.
Noise and Vibration	• Prior to mitigation, moderate noise impact is projected at 245 Summer Street and across Fort Point Channel at Necco Street due to removal of noise buffering USPS facility. The proposed noise wall would mitigate this impact. • No vibration impact.	• No noise or vibration impacts.	• Prior to mitigation, moderate noise impact is projected along Wolcott Street and Riley Road. The proposed noise wall extension would mitigate this impact. • No vibration impact.

Environmental Impacts	South Station	Widett Circle	Readville – Yard 2
Greenhouse Gas Emissions	• Reduction in stationary source greenhouse gas (GHG) emissions by approximately 8% in compliance with the Massachusetts Stretch Energy Code. • Approximately 5% net reduction in carbon dioxide ($CO_{2)}$ emissions from locomotives near South Station, due to decreased congestion and idling time on the tracks. • Saves 46,000 tons of CO_2 per year in the Boston Region Metropolitan Planning Organization (MPO) region.	• Stationary sources not modeled.[1] Facility to comply with Stretch Code. • Increase in mobile source CO_2 emissions by approximately 5,800 tons per year in 2025 and 2035.	• Stationary sources not modeled.[1] Facility to comply with Stretch Code. • Increase in mobile source CO_2 emissions by approximately 2,500 tons per year in 2025 and 2035.
Historic Resources	• No adverse effect on historic properties identified in the Area of Potential Effect (APE). • Improved views to and from Fort Point Channel Historic District due to removal of USPS building and construction of Harborwalk. • No archaeological sensitivity.	• No historic properties affected. • No archaeological sensitivity.	• No historic properties affected. • No archaeological sensitivity.
Site Contamination/ Hazardous Materials	• Identification of three Recorded Environmental Conditions (RECs) and six Historic Recorded Environmental	• Identification of two RECs and seven HRECs.	• Identification of four RECs.

[1] *In a pre-DEIR filing meeting with MEPA and DOER on November 26, 2013, it was confirmed that building energy modeling was not required for the layover facility sites.*

Environmental Impacts	South Station	Widett Circle	Readville – Yard 2
	Conditions (HRECs).		
Construction Impacts	• Temporary rail service impacts, minimized to greatest extent possible. • Temporary traffic disruption and congestion. • Construction within Dorchester Avenue and the USPS parcel can occur with minimal impact to abutting properties, subject to state, local and agency provisions. • Temporary construction impacts may include fugitive dust emissions, direct emissions from construction equipment, and increased emissions from motor vehicles. • Construction noise levels may exceed City of Boston noise limits, but work would be completed in accordance with the City of Boston's noise control ordinances. • Construction vibration levels may exceed FTA criterion for human annoyance. • Potential exposure of contaminated soils, debris or groundwater during construction.	• Construction can occur with minimal impact to abutting properties and railroad operations, subject to state, local and agency provisions. • Temporary construction impacts may include fugitive dust emissions, direct emissions from construction equipment, and increased emissions from motor vehicles. • Potential exposure of contaminated soils, debris or groundwater during construction.	• Construction can occur with minimal impact to abutting properties and railroad operations, subject to state, local and agency provisions. • Temporary construction impacts may include fugitive dust emissions, direct emissions from construction equipment, and increased emissions from motor vehicles. • Construction noise levels may exceed City of Boston noise limits, but work would be completed in accordance with the City of Boston's noise control ordinances. • Potential exposure of contaminated soils, debris or groundwater during construction.

3.3. Land Use and Property

This section discusses the project's impact on property and associated land uses, and also provides the following information requested in the Secretary's Certificate:

- The extent of proposed land acquisitions associated with the layover facilities, and characterization of the existing conditions on the affected properties (Sections 3.3.2);
- Extent and location of known easements within the SSX project area, and clarification of how those easements may impact project construction and operation (Sections 3.3.3); and
- A discussion of MassDOT's legal and regulatory obligations associated with private property acquisitions (Section 3.3.4).

3.3.1. Impact Summary

Land use impacts associated with the project include:

- Acquisition of the U.S. Postal Service (USPS) property (approximately 14 acres);
- Acquisition of a parcel located adjacent to 245 Summer Street (approximately 0.2 acres);
- Reopening Dorchester Avenue to create a public right-of-way (approximately 5.0 acres);
- Acquisition of the Cold Storage and New Boston Food Market properties (approximately 25.1 acres);
- Acquisition of portion of Department of Public Works/City of Boston property (approximately 0.1 acres);
- Acquisition of Foodmart Road and Widett Circle (approximately 6.2 acres); and
- Partial acquisition of the James G. Grant Co. LLC property (approximately 0.7 acres).

3.3.2. Existing Condition of Land to be Acquired

South Station

Figure 3-1 illustrates property ownership in the South Station headhouse area. Expansion of South Station would require the purchase of the adjacent 14-acre parcel currently owned and occupied by the USPS. The USPS currently operates an approximately one million square foot General Mail Facility (GMF) with 90 tractor-trailer loading bays and 242 vehicular parking spaces on the parcel. The USPS site also includes approximately five acres of Dorchester Avenue, a former public roadway converted to federal property for USPS use only. The majority of the land occupied by the GMF would be used for the expansion of the terminal including additional tracks, platforms, and access improvements to the terminal.

The section of Dorchester Avenue previously conveyed for USPS use would be converted back to a public right-of-way, upgraded to meet the *Boston Complete Streets Design Guidelines* and MassDOT's *Healthy Transportation Engineering Directive*, and ownership would be transferred back to the City of Boston. The right-of-way would also include a section of Harborwalk that would connect existing sections of Harborwalk north and south of the project area.

The reopening of Dorchester Avenue would require acquisition of an approximately 0.2-acre parcel of land adjacent to 245 Summer Street at the intersection of Dorchester Avenue and Summer Street. This parcel includes a portion of the patio for the 245 Summer Street building, a retaining wall, and a landscaped buffer between the patio and the sidewalk along Dorchester Avenue. It was part of a previous land transfer from the City of Boston to the owners of 245 Summer Street (BDC Summer St 121A LP). The acquisition of this area is required to provide a safe and functional multimodal intersection at this

location, consistent with MassDOT and City of Boston standards. Further design would determine the extent of the impact and MassDOT would continue to work with the property owner to minimize any impacts.

Widett Circle

Figure 3-2 illustrates property ownership in the Widett Circle area. The proposed Widett Circle layover facility site totals approximately 30.2 acres, and is located in South Boston along the MBTA's Fairmount Line approximately one track-mile from South Station. This site is comprised of publicly and privately-owned parcels on two public roads, Widett Circle and Foodmart Road. As shown in Figure 3-2 and Table 3-2, one of the private parcels is owned by Art Mortgage Borrower Propco and three parcels are owned by the New Boston Food Market. The site also includes City of Boston public roads, a parcel owned by Amtrak, and portions of parcels owned by the City of Boston and the Commonwealth of Massachusetts.

In order to construct the Widett Circle layover facility, the MBTA would acquire up to 31.4 acres of land from various owners as shown below in Table 3-2. While all property belonging to New Boston Food Market would be acquired, the railroad portion referred to as "Parcel E" would remain as an easement for Amtrak use, and therefore, would not be used for the layover facility. Table 3-2 lists the acreage of the properties within the project site boundary, as well as the acreage of those properties to be acquired by MassDOT as part of the project.

Table 3-2 —Widett Circle Properties

Parcel/Owner	Address	Acres within Project Site Boundary	Acres to be Acquired
Department of Public Works Facility/City of Boston	400 Frontage Road	0.1	0.1
Cold Storage/Art Mortgage Borrower Propco	100 Widett Circle	5.0	5.0
New Boston Food Market #1	Widett Circle	0.8	3.7
New Boston Food Market #2	63 Foodmart Road	7.5	7.5
New Boston Food Market #3	22 Foodmart Road	8.9	8.9
Public Roads/City of Boston	N/A	6.2	6.2
Commonwealth of MA	N/A	0.3	0
Amtrak	N/A	1.4	0
Total		**30.2**	**31.4**

Further description of the real estate transactions that would need to be completed are as follows (as shown on Figure 3-2):

- Broad Interlocking is located adjacent to the Widett Circle area. A realignment of the Fairmount Line/Dorchester Branch Track 1 and Track 2 would be necessary in this location. The proposed realignment could require a small partial acquisition of the City of Boston Department of Public Works (DPW) Lot and could impact the garage access ramp located adjacent to the tracks. MassDOT would continue to work with Boston DPW throughout the design process to minimize potential impacts.
- Amtrak owns a parcel that includes the rail right-of-way at the throat of the proposed layover facility. MassDOT would require easements from Amtrak to perform work within this area.

- The parcel at 100 Widett Circle is referred to as the Cold Storage parcel. Cold Storage currently contains a temperature-controlled food storage and distribution facility, owned by Art Mortgage Borrower Propco 2006 2 LP, and used by Americold/Crocker & Winsor Seafoods. The building has an active rail siding served by CSX Transportation, Inc. (CSXT) with space for six freight cars. This parcel would need to be acquired in its entirety.
- The three parcels on Foodmart Road currently comprise the New Boston Food Market. The New Boston Food Market Development Corporation is made up of approximately 30 units leased to multiple businesses in the food processing, food storage, and food logistics industry. Created as an Urban Renewal Corporation, the property is tax-exempt under M.G.L. Chapter 121A (760 CMR 25). Existing buildings on the Widett Circle site total approximately 292,400 sf and the majority of the area around the structures and tracks is paved. One of the three parcels, shown as "New Boston Food Market #1" in Figure 3-2, is primarily a track easement for Amtrak and some trackwork as part of the SSX project would be necessary within this easement area. Although the entire parcel would likely be purchased, only a portion would be required for the layover facility. It is anticipated that the Amtrak track easement would remain. The New Boston Food Market parcels would need to be acquired in their entirety.
- The proposed Widett Circle layover facility site would also require the City of Boston to abandon Foodmart Road and Widett Circle. MassDOT would acquire this land.

Readville – Yard 2

Figure 3-3 illustrates property ownership in the Readville – Yard 2 area. The Readville – Yard 2 site is the location of the existing MBTA Readville layover facility located primarily at 50 Wolcott Court in Readville. The approximately 17.5-acre site is located along the MBTA Fairmount Line/Dorchester Branch, approximately 8.8 track-miles from South Station. Readville – Yard 2 is a maintenance repair facility and the largest layover yard used by the MBTA for its south side service. Currently, it is possible to store up to 10 commuter rail trainsets of varying lengths. Other functions include materials storage, located along the eastern border of the site.

Approximately 0.7 acres of land currently owned by James G. Grant Co. LLC (a private demolition and debris management company) would be required to accommodate the planned expansion of Readville – Yard 2. This area, directly adjacent to the existing tracks, is currently used as a salvage yard and does not contain any permanent structures.

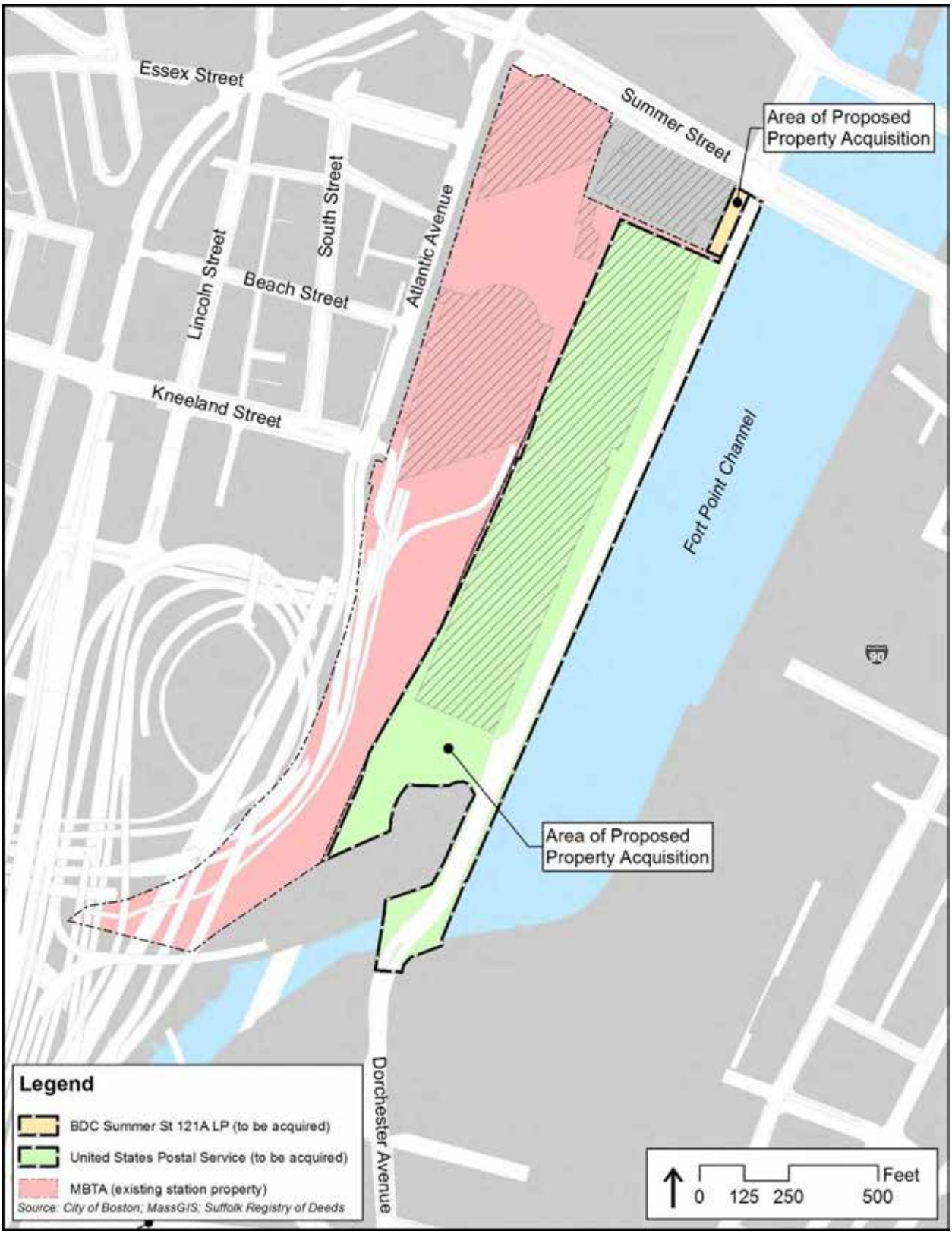


Figure 3-1 — Property Ownership and Proposed Property Acquisitions - South Station

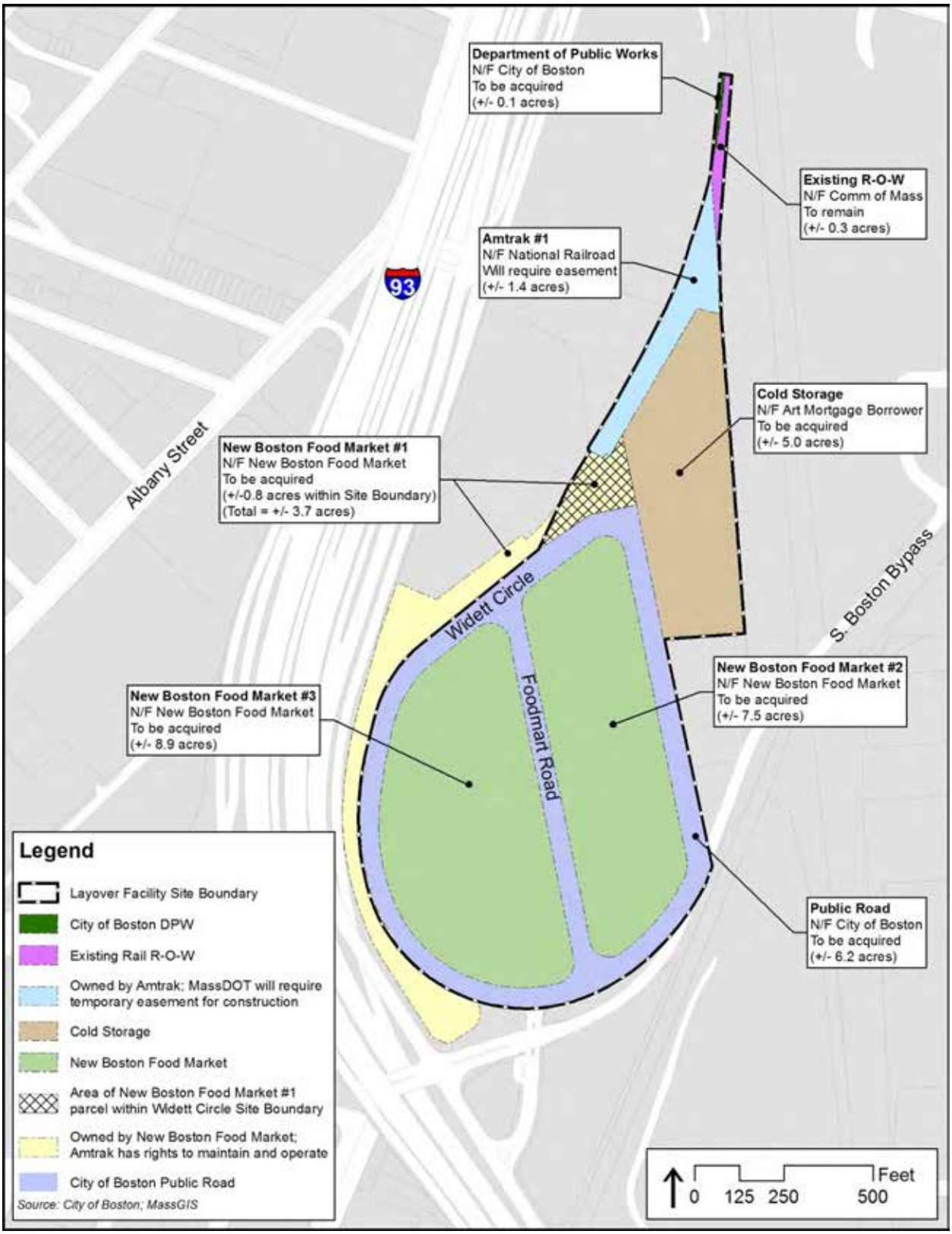


Figure 3-2 — Property Ownership and Proposed Property Acquisitions - Widett Circle

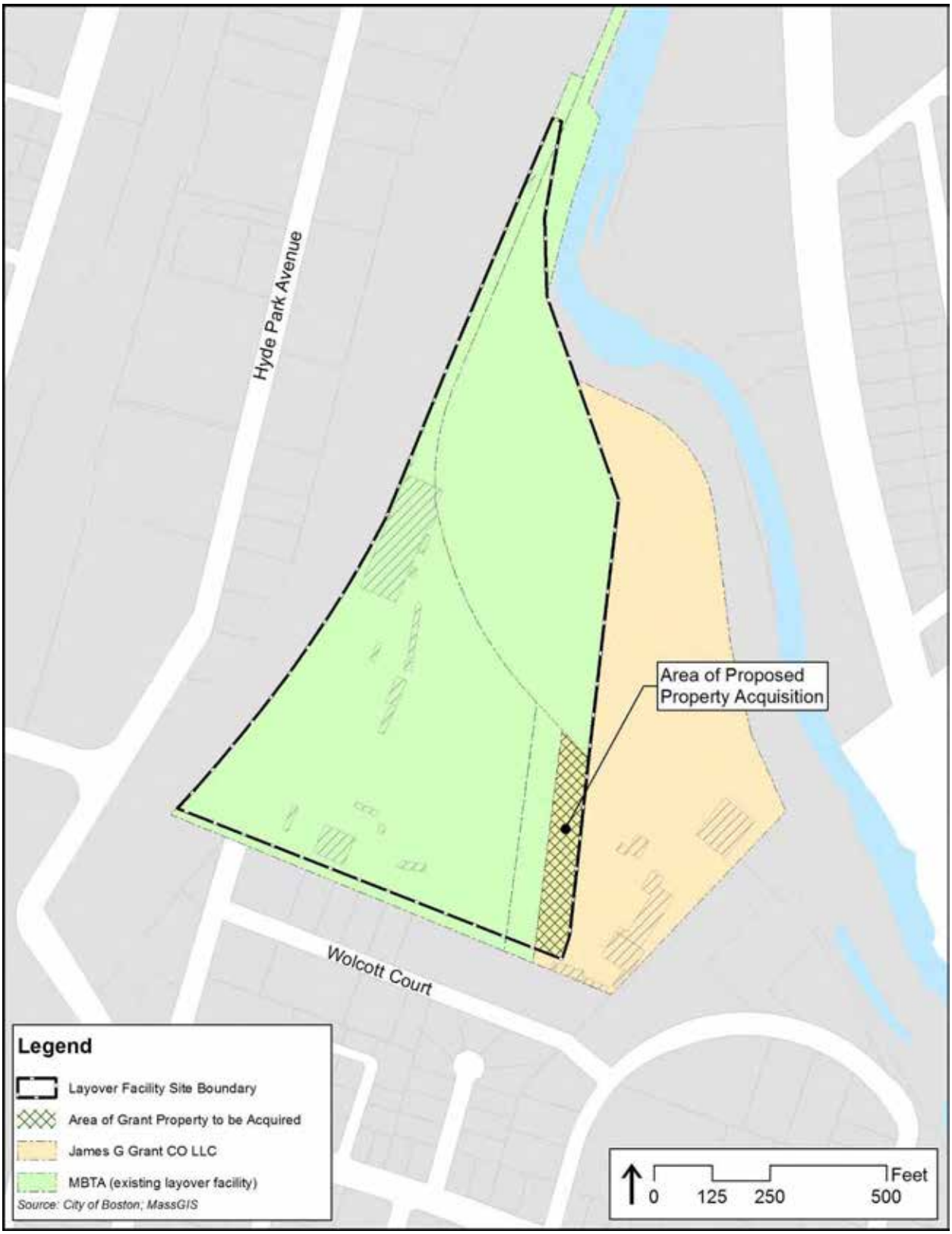


Figure 3-3 — Property Ownership and Proposed Property Acquisitions - Readville – Yard 2

3.3.3. Project Site Easements

The Secretary's Certificate requested that any easements be identified, and that their impact on project construction and operation be clarified. Based on research done to date, MassDOT does not anticipate any significant impacts as a result of the easements identified below. Property easements associated with the agreements between the MBTA, Boston Redevelopment Authority (BRA), USPS, and 245 Summer Street would need to be addressed as part of the acquisition of the USPS parcel. Field verification of utility locations would be conducted prior to construction. At that time impacts on project construction and operations would be assessed and minimized to the extent practicable.

South Station

The following easements have been identified on MassDOT/MBTA property:

- September 25, 1964 – The Boston Terminal Corporation granted a drainage easement to the Turnpike Authority (now MassDOT) for a 36-inch force main and an 8-inch force main within a 30-foot wide strip of land, containing approximately 5,900 square feet.
- May 10, 1979 – The MBTA entered into an agreement with the BRA, USPS, and Summer Street Realty (245 Summer Street) to grant numerous property easements to each party member for access to each other's parcels, and place development restrictions on certain parcels. MassDOT would continue to work with each of these parties throughout the SSX project.
- July 18, 1979 – The MBTA granted a permanent property easement to Summer Street Realty (245 Summer Street) for a two-way pedestrian and vehicular passage in and over land located between 245 Summer Street, and the USPS building and between the USPS building and the existing tracks and platforms at South Station.
- July 5, 1984 – A permanent sewer easement was granted to the Boston Water and Sewer Commission (BWSC) extending from the intersection of Kneeland Street and Atlantic Avenue, south along the MBTA property line to the Broadway street line.
- November 18, 1994 – A utility easement was granted for a subsurface utility corridor as part of the Central Artery/Tunnel project that extends from Kneeland Street across Atlantic Avenue and under the existing tracks south of the platforms.

The following easements have been identified on the USPS property:

- February 5, 1960 – Boston Terminal Corporation land was taken by the U.S. "subject to and reserving all existing easements for public utilities traversing said premises…" and includes the 132-inch x 52-inch changing to an 81-inch x 81-inch drain pipe as an extension of the Kneeland Street combined sewer system to the Fort Point Channel.
- March 16, 1961 – A utility easement was granted by the federal government "for public utilities." This easement is located behind the existing USPS building in the paved area adjacent to the existing tracks.
- August 5, 1974 – The taking of Dorchester Avenue, a 92-foot wide public way adjoining Fort Point Channel, remains subject to "existing easements for public roads and highways, public utilities, railroads and pipelines …."
- May 2, 2008 – The USPS granted a permanent sewer easement to the Commonwealth of Massachusetts (Mass Highway) for the purposes of maintaining and operating a sanitary sewer and related structures and appurtenances. The area is located within the former Dorchester Avenue right-of-way.

Widett Circle

The following easements have been identified on the Widett Circle site:

- August 8, 1916 – The Art Mortgage Borrower Propco parcel was granted a 15-foot wide City of Boston sewer easement that connects the railroad property to Widett Circle.
- August 11, 1965 – A 100-foot drainage easement was granted to enclose Dorchester Creek. Located on the easterly portion of Widett Circle, it follows the centerline of the 54-foot wide roadway and curves to the east through parcels owned by the State, south of Cold Storage. The easement encroaches on the properties abutting both sides of Widett Circle.
- March 25, 1966 – New Boston Food Market granted a track easement to Amtrak, which included rights to operate and maintain the tracks and their appurtenances, and the washer facilities and their service utility requirements, on the parcel labeled as "New Boston Food Market #1" (also referred to as "Parcel E") in Figure 3-2.
- October 21, 1968 – The New Boston Food Market parcel known as "Parcel E" contains a 40-foot wide Boston Edison Company (BECO) easement connecting Frontage Road with Parcel E, and a 10-foot wide BECO easement crossing Parcel E.

Readville – Yard 2

The following easements have been identified on the Readville – Yard 2 site:

- April 3, 1896 – A water main easement was granted on the south side of the Readville – Yard 2 site to accommodate a water main beneath Wolcott Court. The water main crosses the yard in a northerly direction before crossing the Neponset River. The pipe has a maximum interior diameter of 14 inches and was installed with a minimum of four feet of cover according to the easement agreement.
- May 14, 1934 – A 10-foot sewer easement and a 30-foot passage easement in the vicinity of Wolcott Court run parallel to and roughly 120 feet north of Wolcott Street. The sewer easement runs easterly within the 30-foot passage easement, turns in a northerly direction into the Readville Yard, then turns easterly crossing the Neponset River.

3.3.4. MassDOT's Legal and Regulatory Obligations

Any required property acquisitions would be carried out in the following ways to minimize impacts:

- Acquisition would be limited to the minimum footprints required to support each function, including access roads, stormwater management facilities, and employee parking areas, where required.
- All property acquisitions and relocations would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, 42 USC 4601; CFR 49 Part 24 and/or M.G.L. 79; M.G.L. 79A through the MBTA's real estate acquisition team.
- The preferred goal of MassDOT/MBTA is to reach agreements with owners for the purchase of properties required for the SSX project. Property owners would be offered just compensation based on fair market value established by a certified appraiser.

3.4. Wetlands

This section provides a summary of the project's impact on wetland resource areas, and also provides the following information requested in the Secretary's Certificate:

- The location and type of wetlands resource areas on all project sites (Section 3.4.1).
- Clarification of the jurisdiction of the potential isolated vegetated wetland on the Readville – Yard 2 layover facility site, and how MassDOT would meet any applicable regulations and/or performance standards (Section 3.4.2).

3.4.1. Impact Summary

The Massachusetts Wetlands Protection Act (WPA) establishes jurisdiction over special resource areas, including the following resources specific to the SSX project sites: coastal wetlands, rivers, land under water, land subject to coastal storm flowage, land subject to flooding, and riverfront areas. Resource impacts were calculated based on preliminary project footprints that represent the areas within each site boundary where permanent or temporary construction is likely to take place.

South Station

The South Station site has limited vegetation and mainly impervious surfaces. There are no vegetated federal wetlands located in the study area or site boundary. The WPA provides jurisdictional authority over several resource areas within and adjacent to Fort Point Channel, including land under the ocean, land subject to tidal action, coastal bank, and Land Subject to Coastal Storm Flowage (LSCSF). A 100-foot buffer zone extends from the Fort Point Channel's coastal bank. Resource impacts include approximately 700 linear feet of coastal bank and 7.9 acres of 100-foot jurisdictional buffer to coastal bank.

LSCSF corresponds to the elevation of the 1% annual chance floodplain indicated on the 2016 Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRMs). Approximately 2.9 acres of LSCSF is anticipated to be impacted at the South Station site (presented in Figure 3-4). In accordance with the WPA, construction at South Station will need to be preceded by a Notice of Intent and Orders of Conditions in accordance with the requirements in 310 CMR 10.00.

Widett Circle

The Widett Circle site and the surrounding areas are densely developed urban lands consisting of buildings, roadways, and existing rail yards. The site has minimal vegetation and is comprised mainly of impervious surfaces. There are no WPA jurisdictional resources identified within the Widett Circle project boundary. While the project would not affect any land below the 1% annual chance floodplain, approximately 25 acres of 0.2% annual chance floodplain (formerly known as the "500-year floodplain"), would be impacted by the project.

Readville – Yard 2

The Readville – Yard 2 site consists of existing rail infrastructure, disturbed ground, sparsely vegetated grass, and shrub patches among actively-used materials storage areas and the disturbed edge of the wooded riparian buffer to the Neponset River. A site investigation was conducted on December 7, 2015 to evaluate resources at the Readville – Yard 2 site. The bank of the Neponset River was flagged and the associated jurisdictional 25-foot riverfront area and 100-foot buffer zones were established from this boundary. In addition, one bordering vegetated wetland was delineated along the river and five isolated vegetated wetlands were delineated within the footprint of the proposed facility. The five isolated vegetated wetlands are highly and regularly disturbed, include invasive species, are not indicative of natural wetlands and likely developed due to former and on-going land use operations.

As presented in Figure 3-5, approximately 0.01 acres of riverfront area and 0.28 acres of 100-foot buffer zone would be impacted as a result of the proposed improvements at this location. In accordance with the WPA, construction at Readville – Yard 2 would need to be preceded by the filing of a Notice of Intent and Order of Conditions in accordance with the requirements in 310 CMR 10.00.

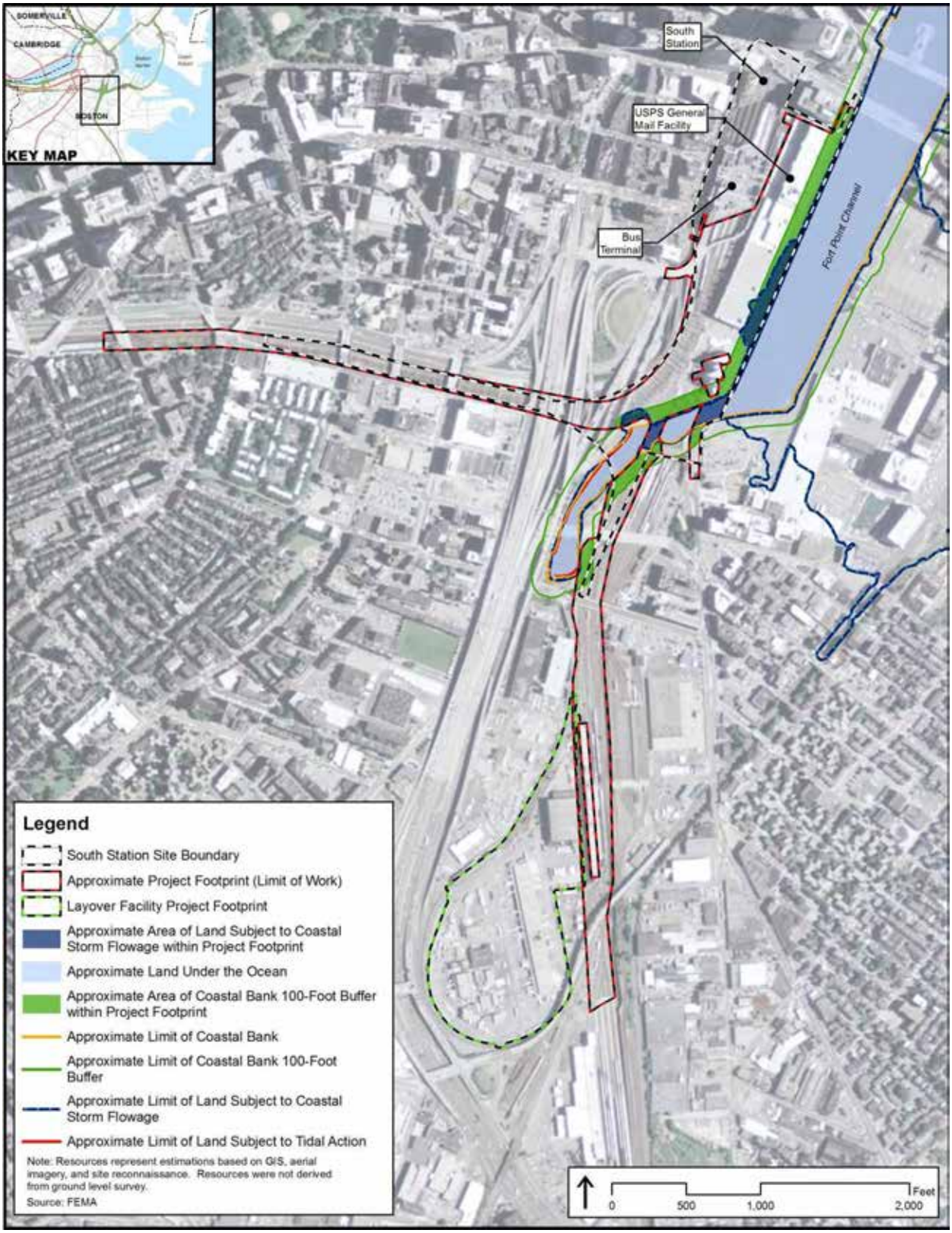

KEY MAP
SOMERVILLE
CAMBRIDGE
BOSTON
South Station
USPS General Mail Facility
Bus Terminal
Fort Point Channel
Legend
South Station Site Boundary
Approximate Project Footprint (Limit of Work)
Layover Facility Project Footprint
Approximate Area of Land Subject to Coastal Storm Flowage within Project Footprint
Approximate Land Under the Ocean
Approximate Area of Coastal Bank 100-Foot Buffer within Project Footprint
Approximate Limit of Coastal Bank
Approximate Limit of Coastal Bank 100-Foot Buffer
Approximate Limit of Land Subject to Coastal Storm Flowage
Approximate Limit of Land Subject to Tidal Action
Note: Resources represent estimations based on GIS, aerial imagery, and site reconnaissance. Resources were not derived from ground level survey.
Source: FEMA
0
500
1,000
2,000
Feet

Figure 3-4 — Wetlands Resources - South Station & Widett Circle Layover Facility

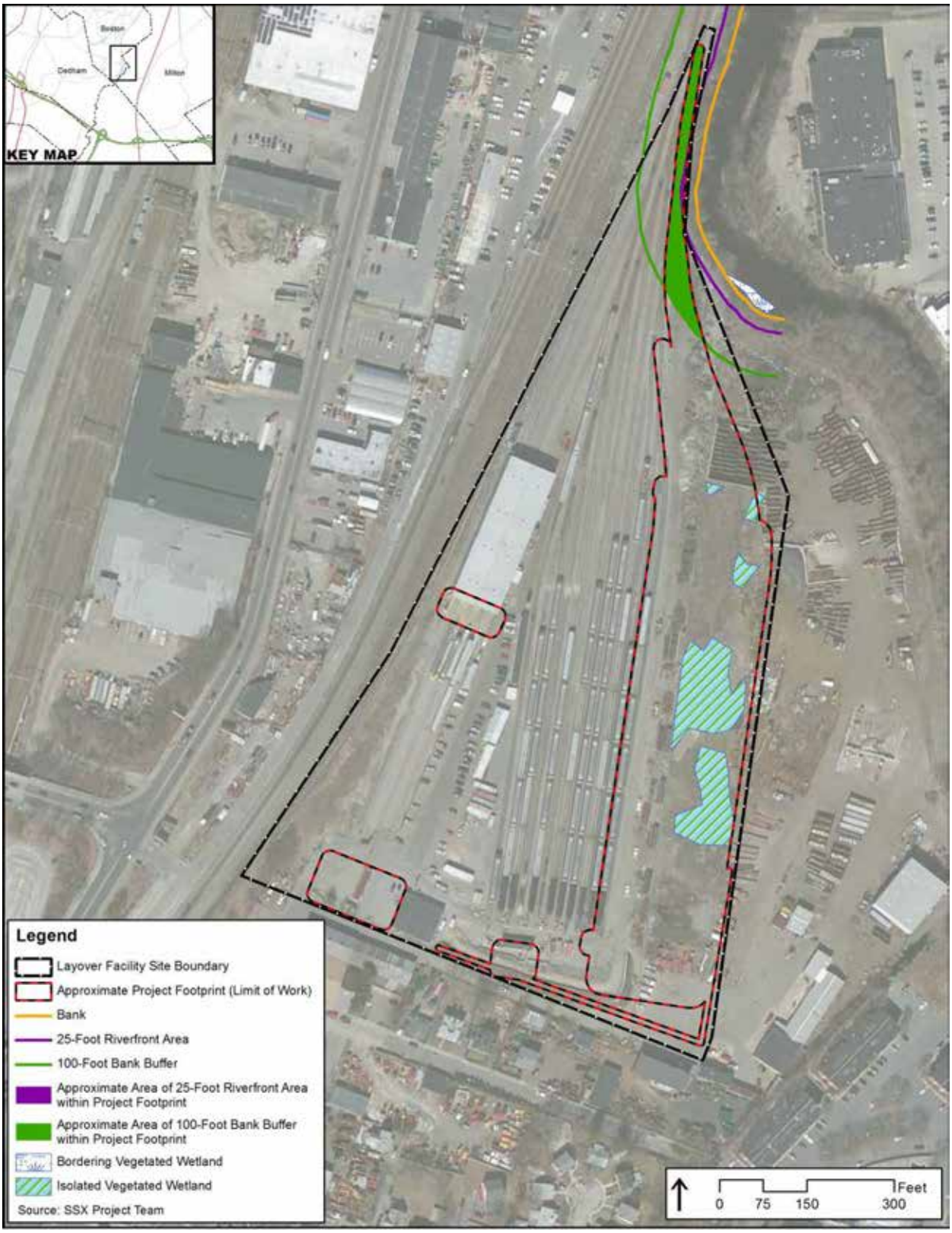


Figure 3-5 — Wetlands Resources - Readville – Yard 2 Layover Facility

3.4.2. Isolated Vegetated Wetlands

In addition to the impacts stated above, nearly the entire approximately 0.64 acre area of the five isolated vegetated wetlands would be impacted as a result of the work at this site. In order to determine potential jurisdiction of the non-bordering (isolated) vegetated wetlands, an evaluation of the hydrologic characteristics was made to determine if the land setting and wetlands meet the jurisdictional criteria as isolated land subject to flooding (ILSF). Similarly, an assessment of the likelihood of the isolated wetlands being federally jurisdictional under Section 401 and 404 of the Clean Water Act was made. Both the on-site evaluation and digital hydrologic volume estimations of these five isolated vegetated wetland areas confirmed that they are not jurisdictional under the WPA as ILSF, and would not require WPA regulation at the state or local level.

These five wetlands do appear to meet the U.S. Army Corps of Engineers' (USACE) criteria for a significant nexus consideration as to the designation of Waters of the United States. Further consultation with the USACE will take place as design advances to determine federal jurisdiction of these five resources. The determination by the USACE would establish whether a Section 401 water quality certification is needed from Massachusetts Department of Environmental Protection (MassDEP). In the event that a Section 404 permit is required from the USACE, and if 401 water quality certification is required, the appropriate steps would be taken to file the application and to meet the prescribed performance standards.

3.5. Chapter 91 Waterways and Tidelands

This section includes a summary of the project's impact on filled tidelands, and also provides the following information requested in the Secretary's Certificate:

- An updated discussion demonstrating how the South Station site would be designed to meet the Chapter 91 licensing criteria (Section 3.5.2); and
- An updated discussion of how the project complies with the Public Benefit Determination criteria (301 CMR 13.00) (Section 3.5.3).

3.5.1. Impact Summary

The project would result in substantial benefits to public rights in filled tidelands at the South Station site, including:

- Removing the nonwater-dependent USPS facility from filled Commonwealth Tidelands;
- Expanding the existing transportation infrastructure at South Station to meet current and future intercity and commuter rail service needs through the construction of critical infrastructure facilities, including new tracks, platforms, a new headhouse fronting on Dorchester Avenue, and related pedestrian-oriented and rail facilities;
- Reopening approximately five acres of filled tidelands to public access that have been closed since 1966, and providing approximately 0.5 miles of newly reopened public roadway; and
- Creating approximately three acres of publicly-accessible open space.

The Widett Circle and Readville – Yard 2 sites are not under Chapter 91 jurisdiction.

3.5.2. Chapter 91 Licensing Criteria

The project would require a new nonwater-dependent infrastructure license in compliance with 310 CMR 9.0 for the construction of tracks, platforms and a new headhouse fronting on Dorchester

Avenue. The project would meet applicable regulatory requirements for nonwater-dependent structures as outlined in the Chapter 91 regulations at 310 CMR 9.55. Of note is the exemption for nonwater-dependent infrastructure facilities from the regulatory standards at 310 CMR 9.51 (Conservation of Capacity for Water-Dependent Use), 310 CMR 9.52 (Utilization of Shoreline for Water-Dependent Purposes), and 310 CMR 9.53 (Activation of Commonwealth Tidelands for Public Use).

In accordance with 310 CMR 9.55, nonwater-dependent infrastructure facility projects are required to include mitigation and/or compensation measures as deemed appropriate by the Department to ensure all feasible measures are taken to avoid or minimize detriments to the water-related public interests. Such interests include, but are not limited to:

- The protection of maritime commerce, industry, recreation and associated public access;
- The protection, restoration, and enhancement of living marine resources;
- The attainment of water quality goals;
- The reduction of flood and erosion-related hazards on lands subject to the 1% annual chance flood event or to sea level rise, especially those in damage-prone or natural buffer areas;
- The protection and enhancement of public views and visual quality in the natural and built environment of the shoreline; and
- The preservation of historic sites and districts, archaeological sites, and other significant cultural resources near waterways.

The project has no negative impact on maritime commerce or industry. Benefits to the public trust rights in tidelands are described in Section 3.5.3.

The project would have no negative impact on the protection, restoration, or enhancement of living marine resources. Through the improvements to water quality described in Section 3.6, the project would help protect living marine resources that may be present in the Fort Point Channel.

Sections 3.4, Wetlands, and 3.10, Climate Change, describe how the site would be designed to reduce flood and erosion-related hazards on land subject to coastal storm flowage for today and the future.

As described in Section 3.5.3, Assessment of Public Benefits, the project involves converting the approximately 14-acre USPS facility to an expanded publicly accessible multimodal transportation facility and a reopened Dorchester Avenue. This would substantially enhance public waterfront access and public views of the natural and built environment along the water's edge.

Finally, the project preserves the historic headhouse and has no adverse impact on cultural resources near waterways. Section 3.14, Historic Resources, provides additional details.

3.5.3. Assessment of Public Benefits

This section includes an updated discussion of how the project complies with the Public Benefit Determination (301 CMR 13.00) criteria established for nonwater-dependent projects located completely or partially within filled tidelands or landlocked tidelands.

Purpose and Effect of the Development

The project's purpose is to expand South Station's rail capacity and related layover capacity in order to meet current and future high-speed, intercity, and commuter rail service needs. The expansion of South Station would enable planned growth in passenger rail along the Northeast Corridor (NEC) and within the Commonwealth of Massachusetts, and would facilitate accompanying improvements in corridor and regional intermodal and multimodal mobility, passenger experience and comfort, economic development, and quality of life.

There are three fundamental transportation deficiencies (needs) the project would address to improve both current and future railroad operations:

- Terminal capacity constraints
- Insufficient layover space
- Inadequate station facilities

The project would have many permanent beneficial effects on the South Station site and surrounding community, including improvements to transportation infrastructure, new public waterfront access to approximately 0.5 miles along the Fort Point Channel and public access to approximately 5.0 acres of public land currently closed to public access and use.

Impact on Abutters and Community

The South Station component of the project would result in a substantial benefit to the general community by addressing critical rail transportation needs; reopening Dorchester Avenue to pedestrian, bicycle and vehicular traffic; and creating a new neighborhood destination that has been effectively isolated from public use since the 1960s when the portion of Dorchester Avenue east of South Station was purchased by the USPS for its exclusive use. The planned transportation improvements would enhance rail service for the traveling public, while providing local transportation improvements and other benefits in the South Station neighborhood including:

- Constructing approximately one-half mile of cycle track and Harborwalk within Dorchester Avenue and providing new pedestrian and bicycle connections between Summer Street and the existing public portions of Dorchester Avenue in South Boston;
- Improving vehicular traffic flow by reducing curbside congestion on Atlantic Avenue; providing an alternative road to accommodate curbside activity; and separating vehicular traffic from pedestrian and bicycle activity;
- Improving pedestrian connections around and through the South Station site to the neighboring communities of the Leather District, Chinatown, and the South Boston Waterfront/Innovation District; and
- Expanding the existing intermodal and multimodal transportation network through improved interconnections between the South Station Rail Terminal and South Station Bus Terminal, as well as with the MBTA Red and Silver Lines.

In addition to the aforementioned intermodal and multimodal transportation improvements, the SSX project would result in economic benefits to the community. As stated in DEIR Section 4.15.2, Potential Impacts, the project would result in an increase in permanent employment within South Station and in system-wide rail-related employment, as well as temporary construction jobs.

Enhancement of Property

As previously mentioned, the project would enhance the 49-acre property (including the South Station and USPS parcels and Dorchester Avenue) by converting an approximately 14-acre parcel from a USPS facility to an expanded publicly accessible multimodal transportation facility and a reopened Dorchester Avenue. The project would provide substantially improved pedestrian, bicycle and vehicular accessibility.

The project would create an expanded headhouse, appropriately designed to complement the existing historic headhouse and provide new and expanded pedestrian connections through the site, to neighboring communities, and to the Fort Point Channel. At the South Station site, the project would re-activate the waterfront along the Fort Point Channel.

Enhanced rail service at South Station would advance MassDOT's goal of promoting mode shift by improving the access, convenience, and availability of transit as a viable alternative to people who would otherwise commute or travel to Boston by car.

The project would advance MassDOT's vision as a national leader in promoting sustainability in the transportation sector. The expansion of South Station would incorporate applicable sustainable design measures, including adaptation strategies. The project would be planned, designed, constructed, and operated consistent with MassDOT policies that identify goals of reducing greenhouse gas emissions; promoting healthy transportation options of walking, bicycling, and public transit; and supporting smart growth development.

The project would comply with all applicable state and federal water quality regulations, which prohibit the degradation of water quality. Consistent with MassDEP's stormwater management policies, the project would include new best management practices (BMPs) to improve water quality to the extent practicable. Both layover facility sites would include improvements in stormwater quality discharged from the sites through the implementation of stormwater BMPs.

Benefits to the Public Trust Rights in Tidelands or Other Associated Rights

The SSX project would result in substantial improvement in public benefits in tidelands through the reactivation of approximately five acres of filled tidelands from their existing predominantly private use to a mix of public interior and exterior uses, which would reactivate the now closed tidelands. At the South Station site, the project would include the reopening of Dorchester Avenue to a public right-of-way to serve bicycle, pedestrian and vehicular users. The replacement of the USPS function with the new headhouse and open space would greatly improve public use and access to filled tidelands at the site. The reopening of Dorchester Avenue would make accessible approximately 0.5 miles along the Fort Point Channel that has been closed to public use since 1966.

By providing South Station users as well as the general public with direct access to Fort Point Channel via an extended Harborwalk, the SSX project would advance an objective of the *Fort Point Channel Watersheet Activation Plan* to enhance *"*the civic role" of Fort Point Channel.[2]

Traditional public trust rights in tidelands and the right to fish, fowl, and navigate have long been precluded at the South Station site by the closure of the site by the USPS. However, the modern expression of these traditional public trust rights on filled land would be realized by the conversion from USPS uses to a combination of rail transportation improvements and restored public access to the waterfront to activate filled tidelands.

Community Activities on the Site

The project would substantially benefit community activities at the South Station site by converting the existing access-restricted USPS site to rail transportation uses to serve public needs, accompanied by substantial improvements in the public activation of Dorchester Avenue. In the existing condition, there are no community activities at the site. As a result of the project, the expanded South Station site would become an important public space attracting rail transportation users and activating approximately one-half mile of Fort Point Channel as an attractive bicycle and pedestrian corridor.

Environmental Protection/Preservation

The project would require multiple local, state and federal approvals, which are listed in Section 1.6, Anticipated Permits and Approvals. These reviews and required approvals would ensure that the project

[2] Boston Redevelopment Authority. *Fort Point Channel Watersheet Activation Plan*. May 2002. Page 8.

minimizes potential environmental impacts to the extent practicable and provides appropriate mitigation for unavoidable impacts.

Before any state agency permit or approval process may commence, the project must undergo Massachusetts Historical Commission State Register Review and Section 106 of the National Historic Preservation Act Review. The project would include work within and adjacent to the South Station headhouse, which is individually listed on the State and National Registers of Historic Places. It would also include work on the seawall, which is a contributing structure to the Fort Point Channel Historic District The project is also located proximate to a number of historic districts, including the Leather District Historic District, the Fort Point Channel Historic District, and the Fort Point Channel Landmark District, which are listed on the State and National Registers of Historic Places. Furthermore, the project requires federal funding and would be subject to review under Section 106 of the National Historic Preservation Act. Section 1.5.2 provides an update on the project-related Section 106 process.

Public Health and Safety

The project would promote public health and safety through implementing a site design that would provide a safe and universally accessible facility from all directions. The design includes on-site and off-site transportation improvements to increase pedestrian and bicyclist safety and accessibility in the neighborhood. Improvements include a new and expanded urban landscape and appropriate lighting and signage to provide a safe well-lit environment for residents, visitors, customers and employees on a permanent basis.

Transportation improvements at South Station would advance public health and safety. Currently, the South Station headhouse facilities are unable to adequately support anticipated passenger service needs. MassDOT seeks to upgrade and modernize existing station platforms to meet current MassDOT design standards and MBTA's and Amtrak's future berthing requirements to accommodate longer trainsets needed to meet future demand. The new pedestrian platforms, circulation, and waiting areas for transit and rail facilities would be designed to provide an acceptable level of service for passengers and other station visitors. Additionally, platform upgrades would be implemented to be in compliance with Americans with Disabilities Act (ADA) and life safety regulations, including emergency egress considerations.

General Welfare

The project would protect the general welfare by improving public infrastructure and expanding transportation capacity, including reducing redundant moves to reposition trains due to a lack of adequate layover space. It would substantially improve the public realm by opening approximately 5 acres of land to public use for pedestrian, bicycle and vehicular use. All of these improvements are being planned in consultation with local, state and federal agencies to avoid potential adverse impacts and maximize project benefits. The SSX project would comply with all applicable local, state and federal environmental protection standards.

3.6. Water Quality and Stormwater

This section includes a summary of the impacts of the project on water quality and stormwater, and also provides the following information requested in the Secretary's Certificate:

- A complete stormwater report with supporting data and graphics (Appendix A, *Stormwater Analysis Technical Report*);
- A description and assessment of the condition of the stormwater and combined sewer overflow (CSO) pipes and outfalls to Fort Point Channel (Section 3.6.2);

- A report on the outcome of soil investigations undertaken to determine the infiltration capabilities and overall suitability of the existing soils for the implementation of surface or subsurface detention, retention, and/or filtration systems at all three project sites (Section 3.6.3);
- A demonstration of the feasibility of stormwater management BMPs (Section 3.6.4);
- Clarification of which proposed BMPs would be implement to meet Total Daily Maximum Load (TMDL) and Land Use with Higher Potential Pollutant Load (LUHPPL) requirements (Section 3.6.4);
- An assessment of the feasibility and potential benefit of constructing a dedicated drainage system for the South Station and Readville – Yard 2 sites (Section 3.6.5); and
- Evaluation of the current condition of the 54-inch drainage pipe at Readville – Yard 2 (Section 3.6.6).

3.6.1. Impact Summary

The project sites are currently covered in a combination of pervious (highly penetrable by water) and impervious (highly impenetrable by water) surfaces. They are also covered by ballast, which is a crushed stone trackbed with characteristics of both pervious and impervious surfaces. As a result of the project, the South Station and Widett Circle sites would undergo a decrease in impervious coverage, as shown in Table 3-3. Readville – Yard 2 would experience an increase in impervious coverage due to 2.0 acres of new pavement. Ballast cover would increase in all three locations. Overall, the project will result in an increase of 0.2 acres of pervious area.

Table 3-3 — Existing and Proposed Land Use Cover

Cover Type	Existing Cover (ac)	Proposed Cover (ac)	Change (ac)	% Change
South Station				
Impervious (pavement, buildings, etc.)	27.2	20.4	-6.8	-25%
Ballast	21.1	26.9	5.8	27%
Pervious (green space, BMPs, etc.)	0.7	1.7	1.0	143%
Total	**49.0**	**49.0**	**0.0**	
Widett Circle				
Impervious (pavement, buildings, etc.)	27.5	12.9	-14.7	-53%
Ballast	2.7	14.3	11.7	433%
Pervious (green space, BMPs, etc.)	0.0	3.0	3.0	N/A
Total	**30.2**	**30.2**	**0.0**	
Readville – Yard 2				
Impervious (pavement, buildings, etc.)	4.5	6.5	2.0	44%
Ballast	6.4	8.2	1.8	28%
Pervious (green space, BMPs, etc.)	6.6	2.8	-3.8	-58%
Total	**17.5**	**17.5**	**0.0**	

Project impacts on water quality and stormwater conditions are described below.

South Station

At the South Station site all peak flows and peak runoff volumes in the post-development condition would be less than the pre-development condition, resulting in an improvement to existing conditions and thereby complying with the Stormwater Regulations. Recharge of stormwater would be provided through the installation of BMPs including a bioretention area in the vicinity of the station. These BMPs would provide approximately 80% Total Suspended Solids (TSS) removal from stormwater runoff from all impervious surfaces on the project site. They would not infiltrate stormwater into the ground in order to avoid potential structural issues related to the proximity of the seawall. The BMPs would improve water quality over existing conditions by providing a comprehensive stormwater management system combined with a 6.8-acre reduction in impervious cover, which would provide treatment for the entire project site.

Widett Circle

At the Widett Circle site, the project would result in a reduction in peak flow rates and runoff volume to less than existing conditions for the 2, 10, 25, and 100- year storm event due to a 14.7-acre decrease in impervious surfaces. Peak flow rate and volume calculations are provided in Appendix A, *Stormwater Analysis Technical Report*. The inclusion of BMPs would further reduce the peak flow rates and volumes from existing conditions. Infiltration may be prohibited as a result of high groundwater, poor draining soils, or soil/groundwater contamination. The project would improve the water quality with the incorporation of a comprehensive stormwater management system by reducing impervious cover by 14.7 acres and providing stormwater BMPs. Proposed BMP's are described in Section 3.6.4.

Readville – Yard 2

At the Readville – Yard 2 site, the project would result in an increase in the proposed peak flow and runoff volumes for the 2, 10, 25, and 100 – year storm events due to the 2.0-acre increase in impervious cover. Peak flow rate and volume calculations are provided in Appendix A, *Stormwater Analysis Technical Report*. However, stormwater BMPs would be installed to ensure peak flow rates and volumes are reduced to pre-development rates. Infiltration may be restricted due to the soil contamination and possible high groundwater due to proximity to the Neponset River. Stormwater BMPs would provide 80% TSS removal of stormwater runoff from all proposed impervious surfaces. BMPs are discussed in Section 3.6.4.

3.6.2. Existing Drainage and Combined Sewer Systems

Existing drainage conditions, described in more detail in Appendix A, *Stormwater Analysis Technical Report*, include 10 stormwater outfalls from the South Station site that discharge to the Fort Point Channel. Three CSOs (BOS 064, 065, and 068) are also in the immediate vicinity of the South Station site. Figure 3-6 presents the location of existing stormwater infrastructure and combined sewer connections at South Station.

According to the December 2012 *Preliminary Assessment Report for Seawall at Fort Point Channel*, nine cast iron pipes penetrate the seawall at locations corresponding to the Dorchester Avenue drainage inlets. Most of the 12-inch diameter pipe show some form of deterioration, either separation of surface layers or moss growth. A large CSO, in the form of an arched granite stone culvert, is protected with siltation and board elements. The BWSC plans to rehabilitate sections of the existing CSO pipe with a 60-inch reinforced fiberglass structural liner. Design plans and other applicable drainage information have been requested from BWSC to assist in developing the final drainage design.

The proposed drainage infrastructure would connect to the existing system, the condition of which would be confirmed prior to final design with the use of record plans and field inspection, and closed circuit videos (CCTV). At this phase of project development, no additional outfalls into the channel are anticipated.

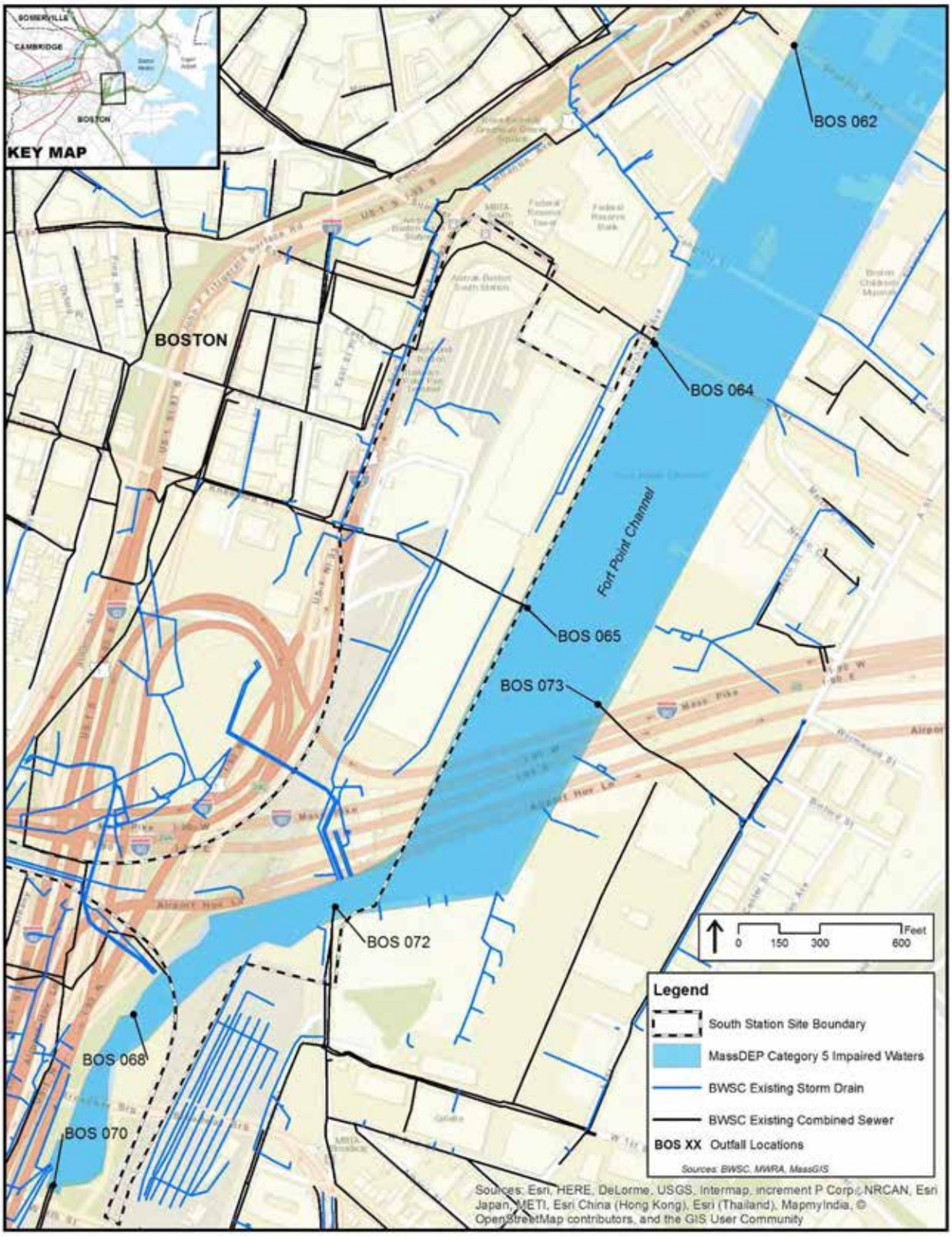


Figure 3-6 — Existing Stormwater Infrastructure - South Station

3.6.3. Soil Conditions and Infiltration Capacity

South Station

Soils in the approximate area of South Station's existing tracks are composed of fill, organic silt, clay, and till peat. These soil types were obtained from a boring location near the existing tracks south of the building limits. There were no signs of inorganic silt or sand at the sampled locations. Similar conditions appeared in the vicinity of the existing USPS building. Samples at these locations show instances of fill, silt, sand, clay, mud, and gravel.

The soil borings also show groundwater elevations varying in depth from 2.8 feet to 17 feet below the surface. Depending on the prevalence of clay in the soil, infiltration could be possible at locations where the water table is at a lower elevation. Additional soil information would be obtained and incorporated into the final design.

Layover Facilities

According to U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil survey maps, the underlying soils at Widett Circle and Readville – Yard 2 are classified as urban land. Urban land is defined as excavated and filled land over natural soils where specific soil characterization is not available through the NRCS soil survey.

The DEIR presented a Phase 1 Environmental Site Assessment for the Widett Circle and Readville – Yard 2 layover facilities based on MassDEP records, and an updated assessment is presented in Section 3.15, Site Contamination and Hazardous Materials. The assessment did not identify any open Release Tracking Numbers (RTNs) or sites with Activity and Use Limitations (AULs) at Widett Circle, but based on current and past industrial uses it is possible some contamination could be encountered that would restrict stormwater infiltration. The assessment did identify one RTN (RTN #3-15991) that remains open at the Readville – Yard 2 site. Infiltration may be restricted at Readville due to existing soil/groundwater contamination, however subsequent testing may allow for site-wide infiltration or pockets of infiltration. MassDOT would complete geotechnical borings and/or test pits during the design development phase to determine the hydraulic permeability, groundwater elevations, and soil/groundwater contamination levels, and the potential to implement infiltration and non-infiltration BMPs. Appendix A, *Stormwater Analysis Technical Report,* further describes the existing soil conditions.

3.6.4. Stormwater Best Management Practices

South Station

Stormwater BMPs are measures designed to reduce volume and peak runoff rates and improve water quality. The existing drainage system and the potential location of the BMP proposed for the South Station site are shown in Figure 3-7, while Figure 3-8 provides an example of the type of BMP that would be implemented.

In the space adjacent to Dorchester Avenue low impact development (LID) measures would be implemented, including a bioretention area with pre-treatment. The LID techniques would detain runoff and decrease the peak flow volume of the CSOs during rain events. Standard structural measures would be used for pre-treatment in conjunction with the LID measures, such as deep sump catch basins and water quality structures. Near the station entrance, some smaller BMP measures could be installed, which may include tree box filters; porous pavement; surface basins, swales, or gravel wetlands; and/or other multi-functional stormwater treatment measures. Figure 3-9 provides examples of the types of proposed BMPS, while Figure 3-10 presents their potential locations. Figure 3-11 presents a section view of Dorchester Avenue's proposed stormwater management system. These measures would also reduce pollutant loads. Appendix A, *Stormwater Analysis Technical Report*, presents more detailed information about the proposed BMPs.

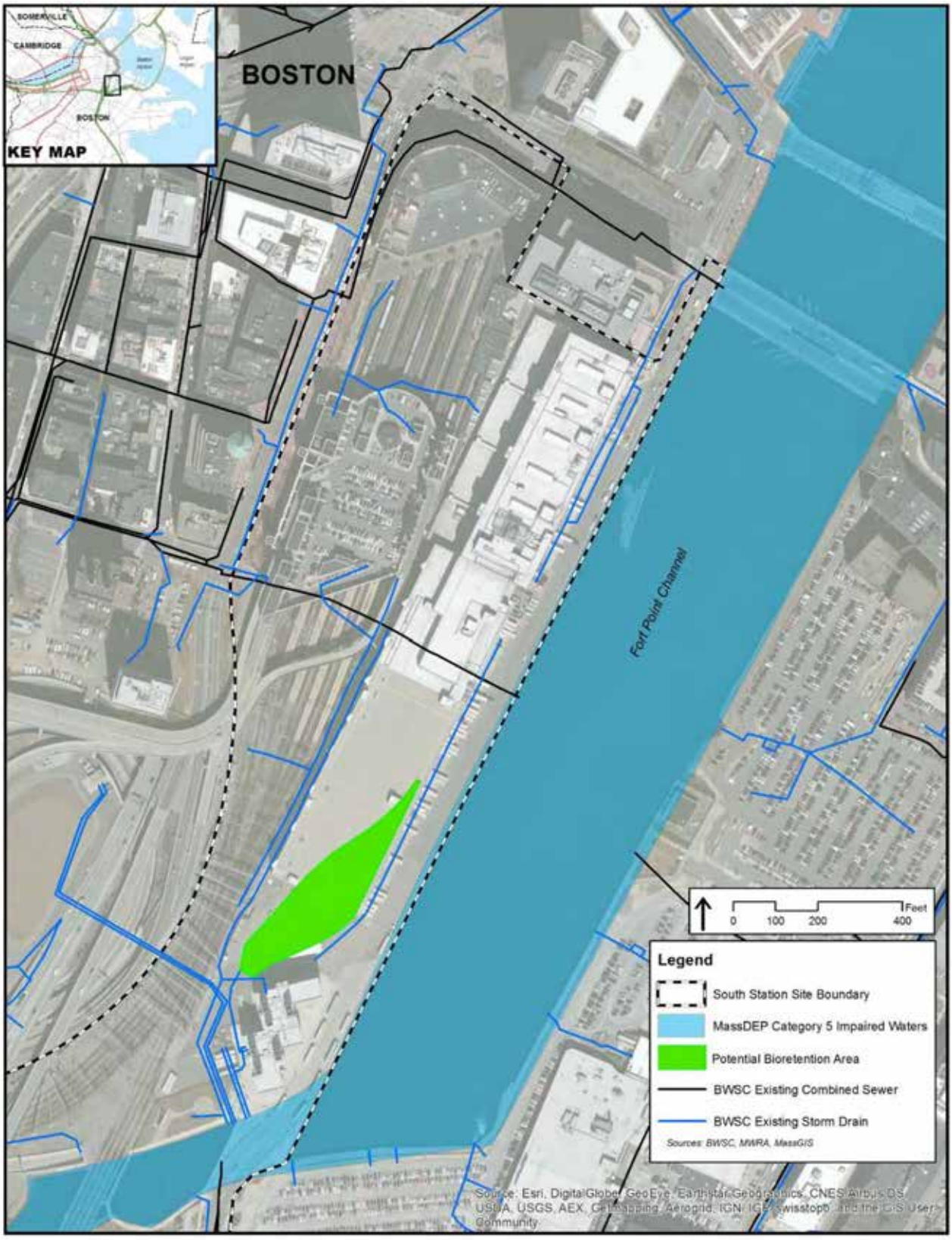
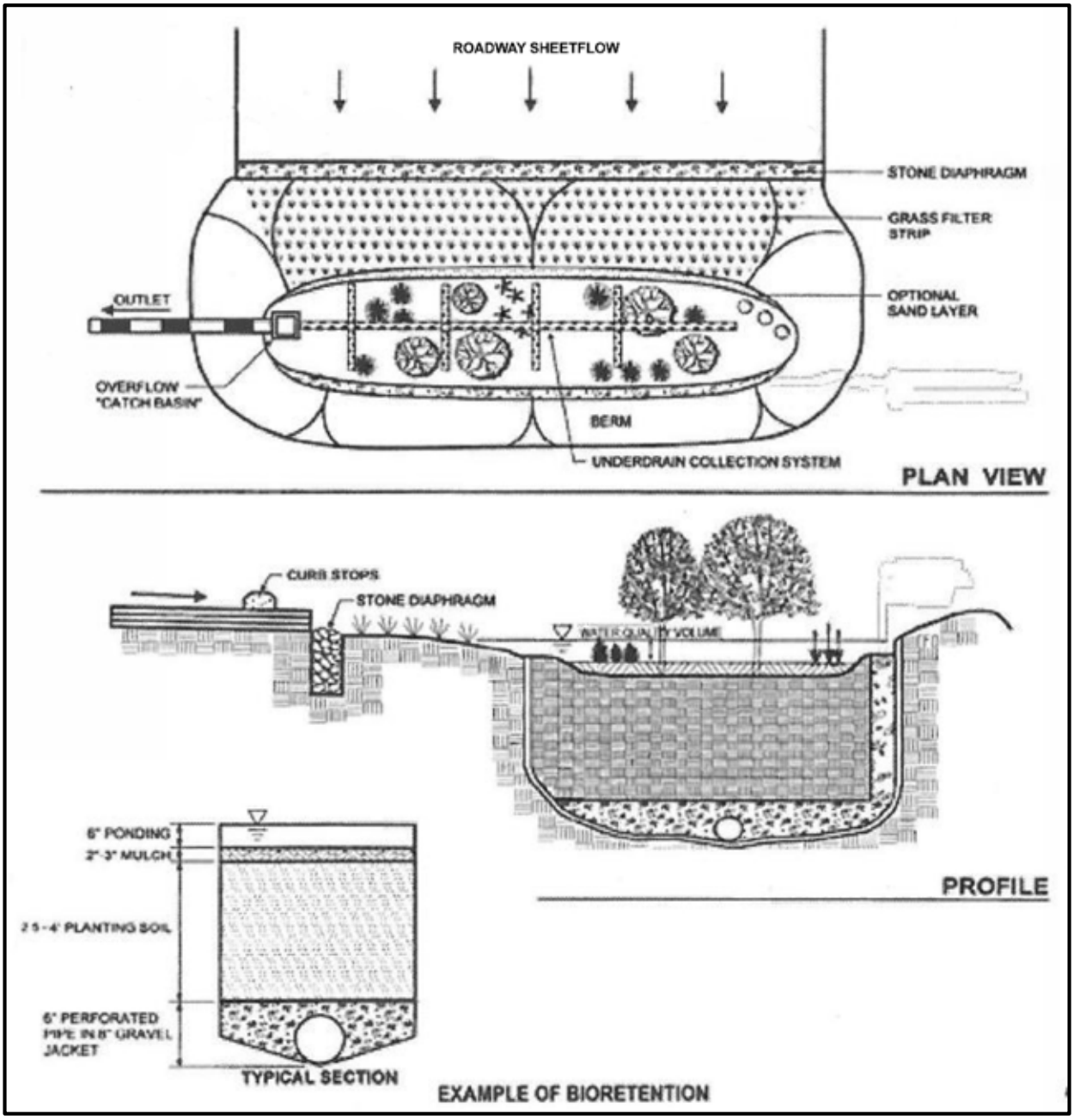

SOMERVILLE
CAMBRIDGE
BOSTON
KEY MAP
BOSTON
Fort Point Channel
0 100 200 400 Feet
Legend
South Station Site Boundary
MassDEP Category 5 Impaired Waters
Potential Bioretention Area
BWSC Existing Combined Sewer
BWSC Existing Storm Drain
Sources: BWSC, MWRA, MassGIS
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Figure 3-7 — Stormwater Management - South Station



Source: Adapted from the Massachusetts Stormwater Handbook, Volume 2, Chapter 2: Structural BMP Specifications for the Massachusetts Stormwater Handbook.

Figure 3-8 – Stormwater Bioretention BMP Details

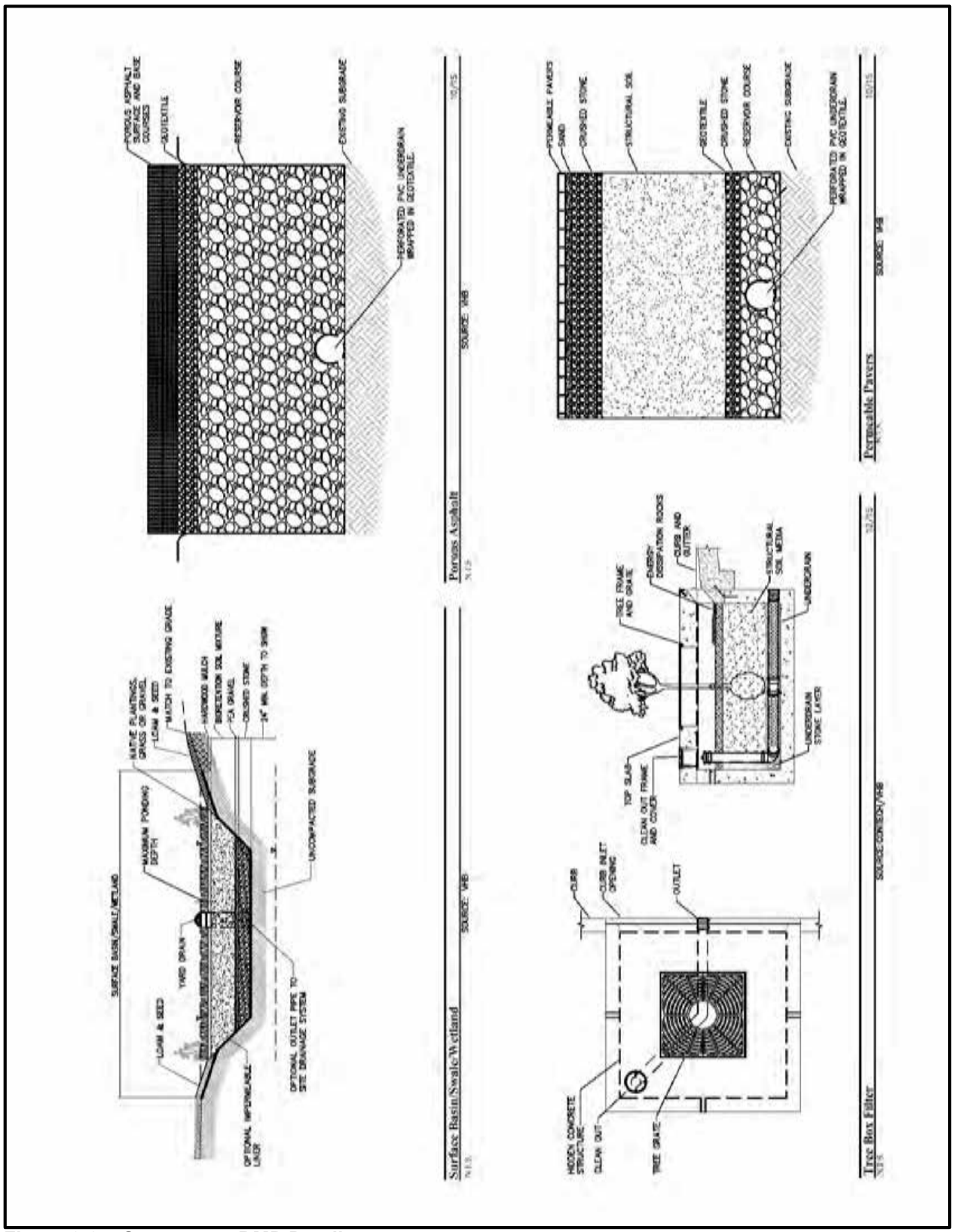


Figure 3-9 – Stormwater BMP Details

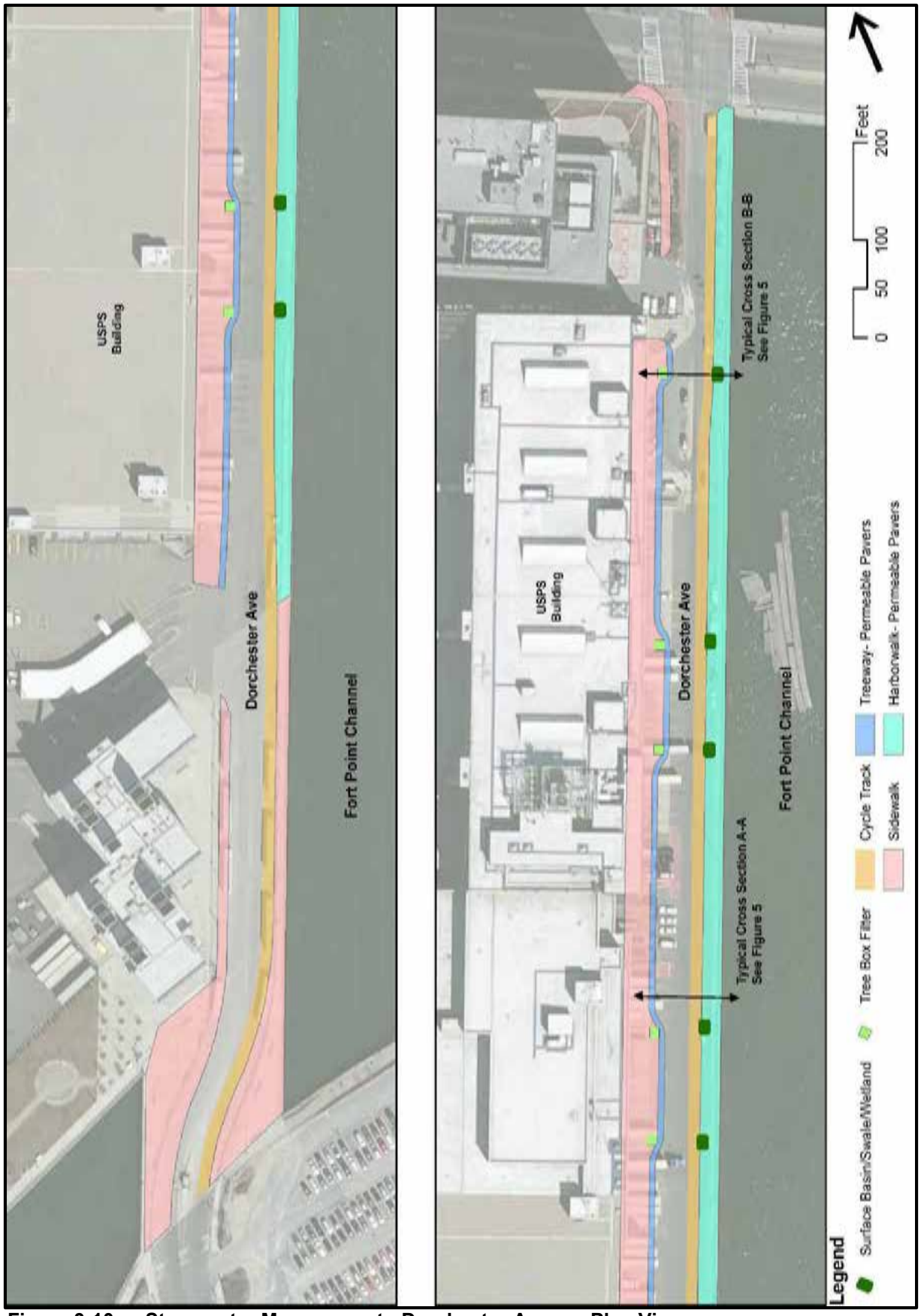


Figure 3-10 — Stormwater Management - Dorchester Avenue Plan View

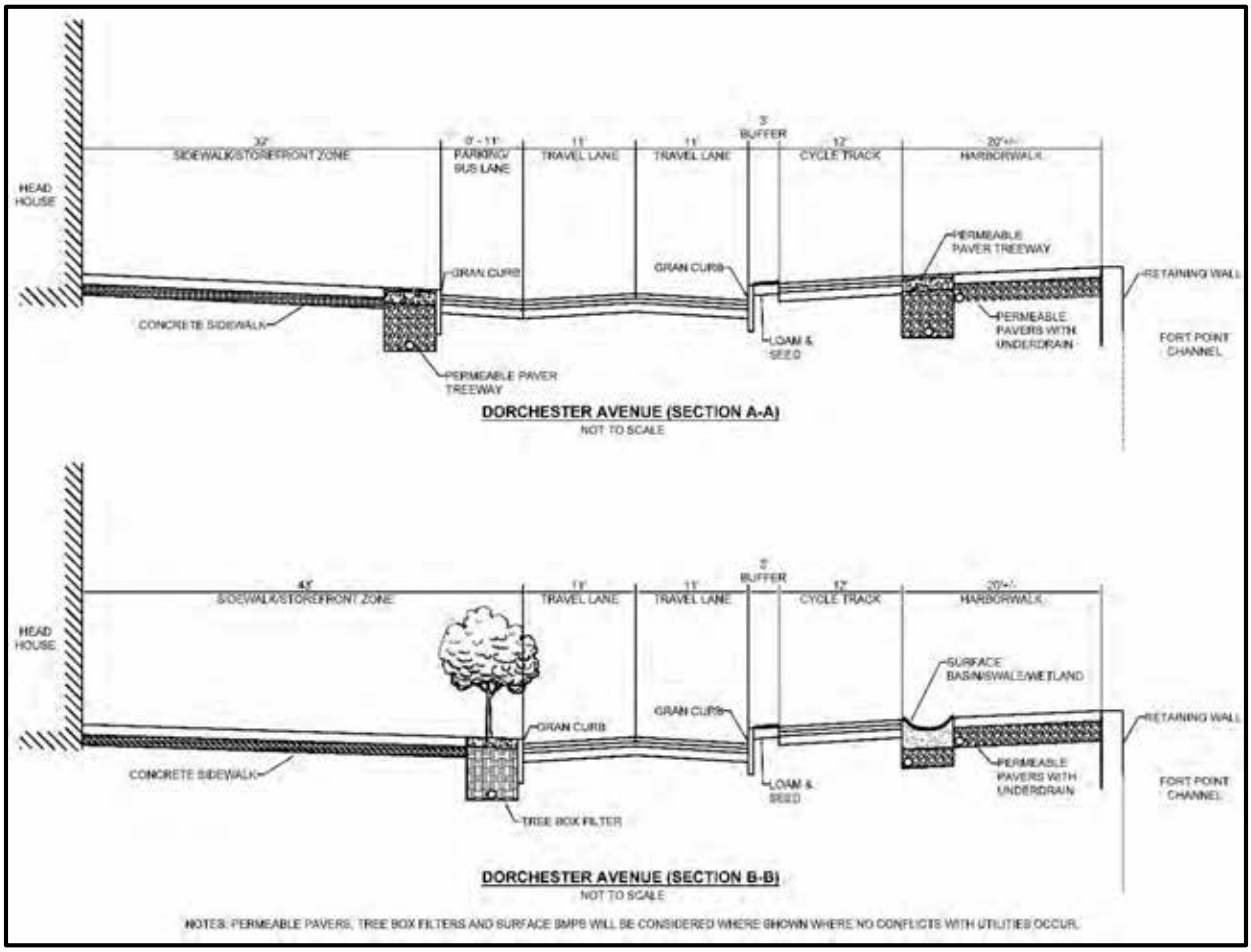


Figure 3-11— Stormwater Management - Dorchester Avenue Section

The South Station site is considered a Land Use with a Higher Potential Pollutant Load (LUHPPL) and, therefore, would be designed with suitable BMPs sized to treat the one inch Water Quality Volume and provide the pretreatment requirement of 44% TSS removal prior to infiltration. Appendix A, *Stormwater Analysis Technical Report*, provides a detailed description of the alternatives and potential stormwater BMPs. Figure 3-12 depicts a conceptual track drainage plan for South Station.

MassDOT would develop a Post Construction Stormwater Operation and Maintenance (O&M) Plan for South Station during the final design. The City of Boston would develop the Post Construction Stormwater Operation and Maintenance (O&M) Plan for the Dorchester Avenue portion of the South Station site.

Layover Facilities

The project is required to meet the Massachusetts Stormwater Management Standards, and the Neponset River TMDL. Comprehensive stormwater management systems with BMPs are proposed at Widett Circle and Readville – Yard 2 to comply with these standards (see Figures 3-13 and 3-14). The project team has coordinated with the BWSC regarding the project and would continue to do so as the project advances to the next phase of project development.

As the design progresses, locations, types, and sizes of the stormwater BMPs would be refined. Potential BMPs include porous pavements, vegetated grass swales and basins, leaching basins, and green roofs. Figures 3-13 and 3-14 highlight the potential BMP locations for each layover facility.

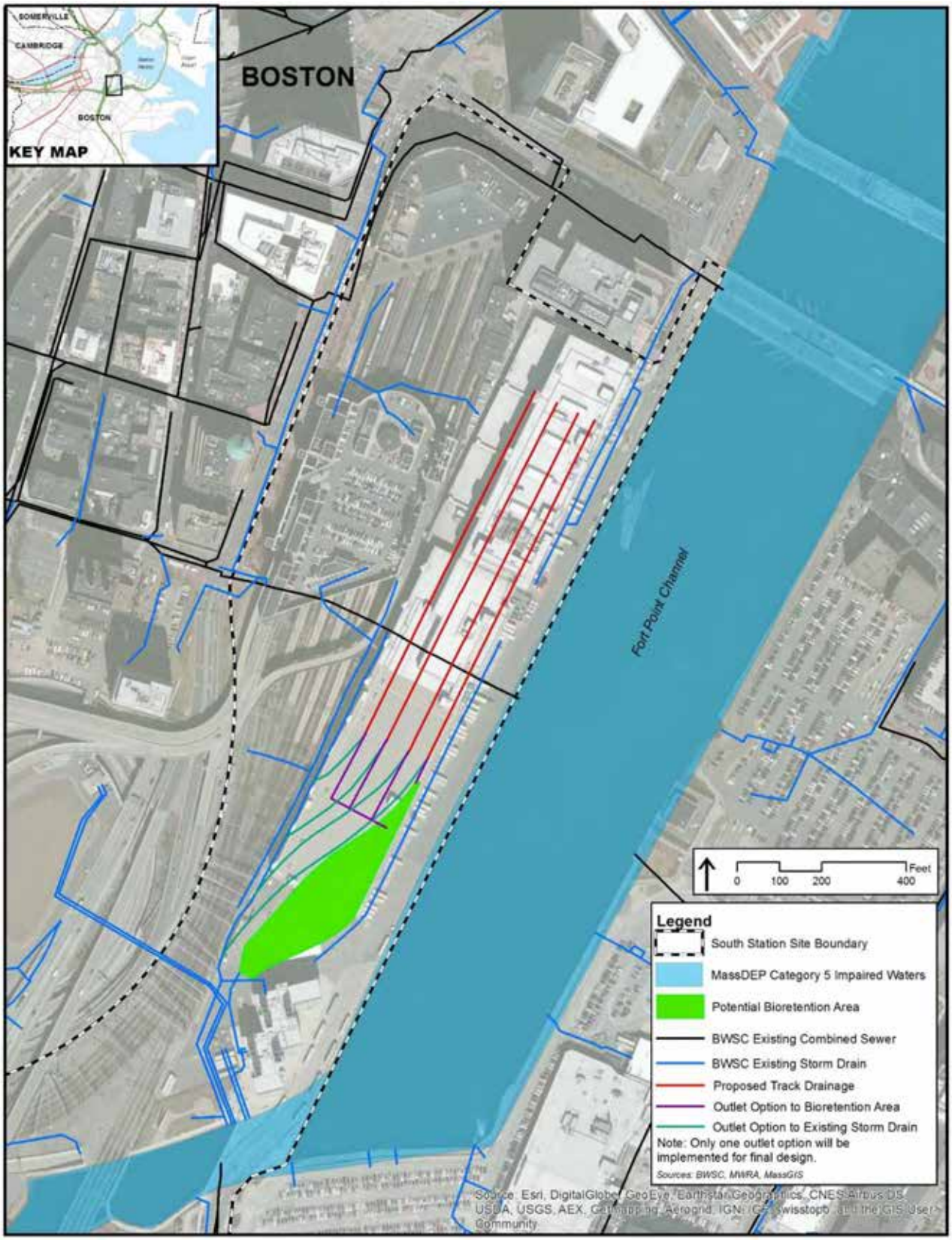

BOSTON
KEY MAP
SOMERVILLE
CAMBRIDGE
BOSTON
Fort Point Channel
0 100 200 400 Feet
Legend
South Station Site Boundary
MassDEP Category 5 Impaired Waters
Potential Bioretention Area
BWSC Existing Combined Sewer
BWSC Existing Storm Drain
Proposed Track Drainage
Outlet Option to Bioretention Area
Outlet Option to Existing Storm Drain
Note: Only one outlet option will be implemented for final design.
Sources: BWSC, MWRA, MassGIS
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Figure 3-12 — South Station Track Drainage Concept Plan

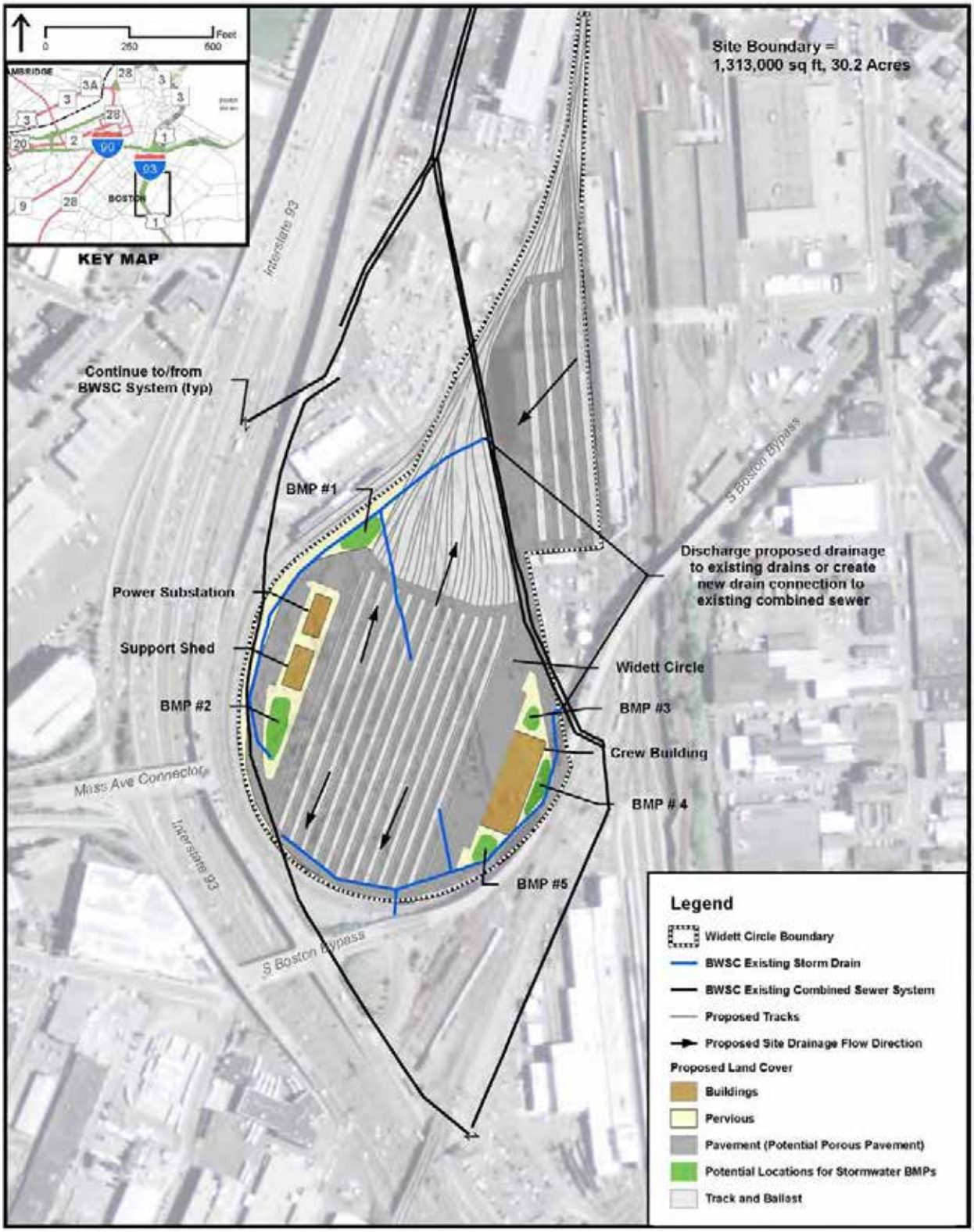


Figure 3-13 — Stormwater Management - Widett Circle Layover Facility

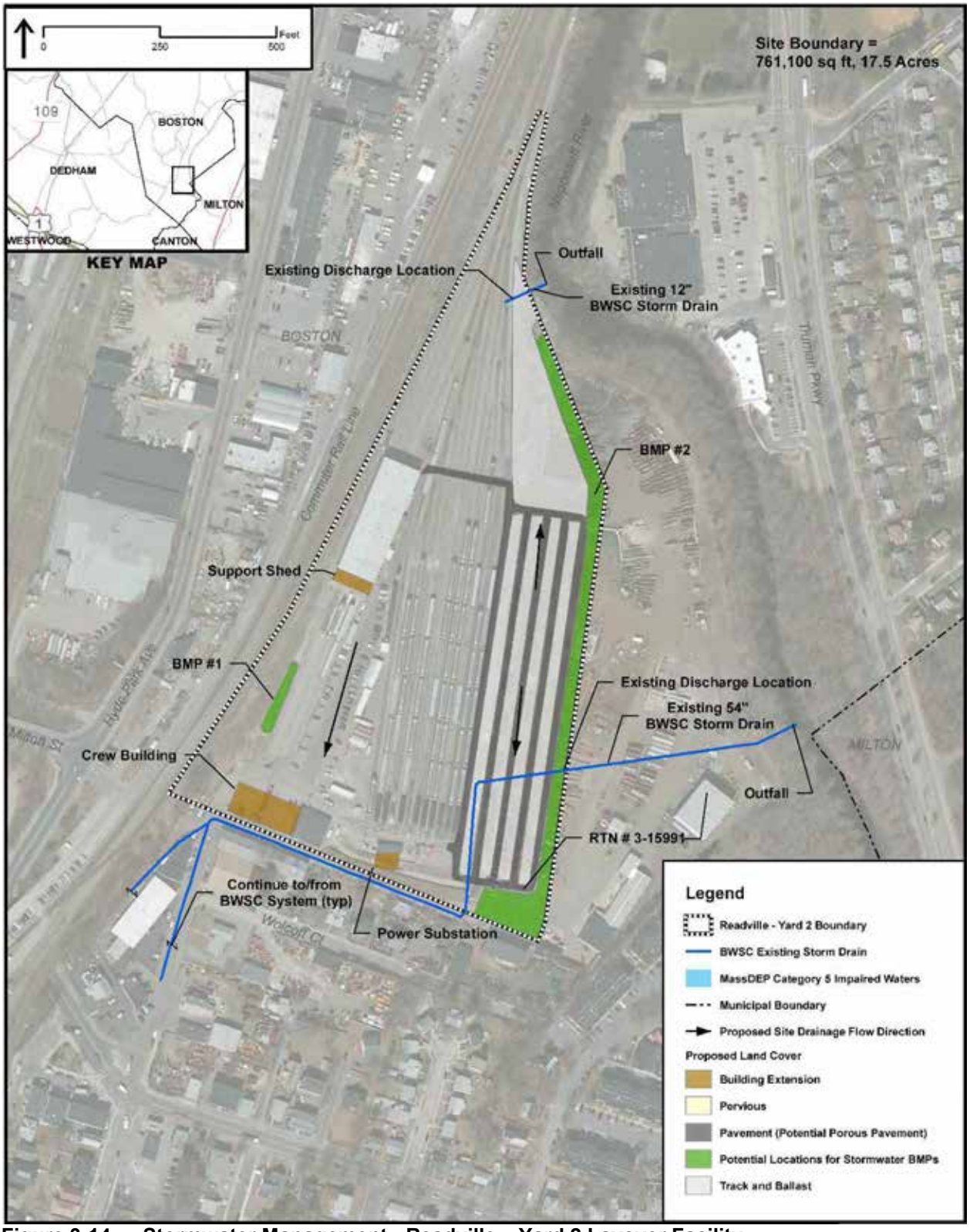


Figure 3-14 — Stormwater Management - Readville – Yard 2 Layover Facility

The project intends to utilize infiltration, if possible, to maximize the pollutant removals from the BMPs and provide groundwater recharge. Future subsurface investigations would identify any potential constraints that could prohibit the use of infiltration measures. Each BMP would provide peak rate attenuation and water quality treatment. The project would provide pretreatment with deep sump catch basins, drip pans and water quality structures.

The layover sites are considered LUHPPLs and, therefore, would be designed with suitable BMPs sized to treat the one inch Water Quality Volume and provide the pretreatment requirement of 44% TSS removal prior to infiltration. Appendix A, *Stormwater Analysis Technical Report*, provides a detailed description of the alternatives, potential stormwater BMPs, and compliance with regulatory requirements including calculations for the required Water Quality Volume.

MassDOT would develop a Post Construction Stormwater Operation and Maintenance (O&M) Plan for the layover facilities during the final design.

3.6.5. Potential Dedicated Drainage Systems

The proposed drainage system at the South Station site will connect to the existing system and discharge via the existing outlets. The design provides a reduction in impervious area and therefore would result in reduced peak rate flows and volumes from existing conditions to the combined sewer system. Developing a new, dedicated drainage discharge system, however, could require easements and additional utility relocation for work within the project site. A dedicated drainage system, also known as a separate sewer system, consists of two different sewer pipes for sanitary and stormwater flows. The sanitary sewer pipe transports sanitary sewage collected from the laterals (plumbing connections) of homes, businesses, and industry to treatment plants. The stormwater sewer pipe carries water collected from street inlets, building downspouts, and other storm sewer lines to a nearby receiving stream and is discharged through a stormwater outfall.

An additional outfall would cause more disruption to the Fort Point Channel both during construction and afterward. The watershed of the South Station site is located at the most downstream location of the existing CSO system. It is expected that stormwater from South Station would enter and be discharged from the CSO prior the peak flow rates of the larger upstream watershed entering the CSO at this location. For this reason, and due to potential reduction in peak flow rates resulting from the project, no benefit would be gained by constructing a dedicated drainage system.

The proposed drainage system at Readville – Yard 2 would connect to the existing system and discharge via the existing drainage points. Developing a new, dedicated drainage discharge system from the site to the Neponset River would require easements and additional permitting for work within resource areas. An additional outfall would cause more disruption to the river resource both during construction and due to the permanent outfall. Similar to South Station, the watershed of Readville – Yard 2 is also located at the most downstream location of the existing 54-inch BWSC drainage system. It is expected that drainage from Readville – Yard 2 will enter and be discharged prior to the peak stormwater rates of the larger upstream watershed entering the 54-inch pipe at this location. Additionally the peak flow rates from the Readville – Yard 2 project site may be reduced from existing conditions further reducing the stress to the 54-inch pipe. As a result of the potential reduction in peak flow rates, and the stormwater from the Readville – Yard 2 site being discharge prior to the peak flow rates from the upstream watershed, there would be no significant benefit to constructing a dedicated drainage system.

3.6.6. Readville – Yard 2 Storm Drain Condition

In the southern portion of the site, there is a 54-inch storm drain just east of the existing track layout that drains an upstream neighborhood and outfalls to the Neponset River. The age and condition of this pipe are unknown. During the project's design phase MassDOT would inspect the storm drain and assess its condition to determine if the pipe should be relocated, replaced or if a structural liner could be installed.

MassDOT would coordinate with BWSC during the design phase to inspect and upgrade the existing system within Readville – Yard 2, as necessary.

3.7. Water Use and Wastewater

This section includes a summary of the project's impact on water use and wastewater, and also provides the following information requested in the Secretary's Certificate:

- A table further clarifying existing and proposed project-related wastewater flows, including those that may currently be attributable to the USPS facility and those identified as part of the SSAR project (Section 3.7.1);
- Demonstration that any proposed changes to the physical configuration, location, and/or hydraulic performance of sewers and outfalls would not affect compliance with Federal Court mandates and regulatory requirements (Section 3.7.2);
- Clarification of potential water use and wastewater generation at the proposed layover facilities based upon operational programming (e.g., car washing) (Section 3.7.3); and
- Identification of any additional permitting requirements if industrial wastewater discharges are proposed as part of the project and discussion of BMPs that could be implemented to reduce water use and wastewater discharges (e.g., use of recycled wash water) (Section 3.7.3).

3.7.1. Impact Summary

South Station

The estimated total water usage at the South Station site would be approximately 538,000 gallons per day (gpd) and the wastewater generation at the site would be approximately 490,000 gpd (Table 3-4), an increase of approximately 30% over existing conditions. The estimated water usage and wastewater generation at the South Station site would be partially offset by the removal of the USPS facility. The domestic water use for the station was calculated on a conceptual level based on the estimated sewage generation with an added 10% factor to account for consumption, system losses and other use.

Table 3-4 — Estimated Existing and Proposed Water Usage and Wastewater Generation for South Station

Location	Existing Water Usage (gpd)	Proposed Water Usage (gpd)	Existing Wastewater Generation (gpd)	Proposed Wastewater Generation (gpd)	% Change
Headhouse	253,000	456,500	230,000	415,000	80%
South Station Retail (floor 2)	1,199	1,199	1,090	1,090	0%
South Station Office (floors 2-5)	10,384	10,384	9,440	9,440	0%
Bus Terminal	83,105	95,150	75,550	86,500	14%
Bus Terminal Parking	220	220	200	200	0%
USPS Building (removal)	24,992	-24,992	22,720	-22,720	-100%
Total	372,900	538,461	339,000	489,510	44%
Total Project-Related Increase		**165,561**		**150,560**	

Additionally, the SSX project would incorporate water efficiency measures, such as low flush toilets, which would minimize the use of water and wastewater generation. Proposed improvements would include upsized service connections to the expanded terminal concourse. Depending upon the construction staging and location of service connections within the new buildings, replacing the existing sewer main could be required within Dorchester Avenue. BWSC indicates that there is adequate capacity available in its water and sewer mains in the immediate vicinity of the South Station site to accommodate the SSX project. The water system design approach, as well as existing capacity, would be further evaluated as design progresses.

MassDEP's Policy on Managing Infiltration and Inflow (I/I) in MWRA Community Systems[3] requires that additional wastewater flow be offset by reducing I/I into sewer systems if a project exceeds any MEPA threshold for an EIR and generates 15,000 or more gpd of wastewater. Inflow is stormwater that enters the wastewater system through rain leaders, basement sump pumps or foundation drains illegally connected directly to a sanitary sewer pipe, while infiltration is groundwater that seeps into sewer pipes through cracks, leaky pipe joints and/or deteriorated manholes. Demonstration of compliance with this policy generally consists of calculating the net increase in wastewater flows to the sewer system and identifying improvements to the sewer system that directly connect to the MWRA interceptor system. Mitigation is required at a 4:1 ratio: for every one gallon of flow into the system due to the new development, four gallons of inflow and/or infiltration must be removed from the system. As project design advances, and in consultation with MassDEP and BWSC, MassDOT would develop an I/I plan to mitigate for increased flows at the South Station site. BWSC indicates there likely is not adequate existing piping in the immediate vicinity of the project site to meet the I/I requirements. Sewer systems that are hydraulically connected to the mains in the vicinity of the South Station site potentially could be used to meet I/I sewer system rehabilitation requirements, however, and opportunities to implement an I/I program may exist in other areas in Boston.

Layover Facilities

The layover facility sites would require domestic sewer for the crew building and support shed proposed at each site. Only light maintenance activities are proposed at the facilities, therefore, no industrial wastewater would be generated. According to BWSC, its existing systems at both sites have adequate capacity to handle the proposed water demand and wastewater discharge. Capacity would be further evaluated as project design advances. Due to the low amount of wastewater anticipated to be generated from the layover facility sites (below the 15,000 gpd threshold), they would be exempt from MassDEP's I/I offset requirements. For more details see Appendix A, *Stormwater Analysis Technical Report*.

As shown in Table 3-5, the Widett Circle layover facility would require approximately 6,440 gallons of water per day. As a result of the project there would be a decrease in the overall water demand and wastewater generated at the site from existing conditions, due to fewer personnel on site and no industrial water use. Water usage would decrease by approximately 8,020 gpd from existing conditions; and wastewater generation would decrease by approximately 7,290 gpd, or 55% from existing conditions.

Table 3-5 — Estimated Wastewater Generation and Water Usage for Widett Circle

Location	Existing Water Usage (gpd)	Proposed Water Usage (gpd)	Existing Wastewater Generation (gpd)	Proposed Wastewater Generation (gpd)	% Change
Widett Circle	14,460	6,440	13,140	5,850	-55%

[3] Massachusetts Department of Environmental Protection, Policy No. BRP 09-01, September 24, 2010.

Table 3-6 — Estimated Wastewater Generation and Water Usage for Readville – Yard 2

Location	Existing Water Usage (gpd)	Proposed Water Usage (gpd)	Existing Wastewater Generation (gpd)	Proposed Wastewater Generation (gpd)	% Change
Readville – Yard 2	2,150	3,870	1,950	3,510	80%

As shown in Table 3-6, the Readville – Yard 2 layover facility would require approximately 1,720 gallons of water per day for the additional and/or expanded facilities for a total of 3,870 gpd. The new wastewater discharge would be 3,510 gpd accounting for an increase over existing conditions by an estimated 1,560 gpd, or 80%.

3.7.2. Impacts to Existing Combined Sewer Overflows

Existing wastewater collection at the South Station site is provided through a series of BWSC sanitary sewer mains, combined sewer mains, and CSOs. In general, sanitary sewers convey wastewater (sewage). During storm events with higher flows where capacity is exceeded, wastewater and stormwater flows combine and are diverted to CSOs, which outlet to Fort Point Channel. A gravity sewer main exists along the west side of Dorchester Avenue and at different points collects sewage from the USPS facility, the I-90 Vent Building, and the existing headhouse. At and adjacent to the South Station site, two combined sewer mains, originating off-site via Beach Street and Kneeland Street, discharge to Fort Point Channel via one of two CSOs (BOS 064 or BOS 065) along Dorchester Avenue. A third CSO, BOS 068, is located within the site just south of the existing USPS facility.

This combined sewer line flows northward from Foundry Street as a 30-inch by 60-inch reinforced concrete pipe. As the combined sewer crosses Broadway it then heads eastward and crosses Dorchester Avenue. From there it enlarges to a 40-inch by 60-inch concrete culvert where it discharges to Fort Point Channel. During final design, MassDOT would confirm existing outlet discharge flows through data collection and/or field inspection.

Presently the USPS building is situated over the BWSC's 81-inch by 81-inch Kneeland Street CSO. Demolition of the USPS building and any construction activity for SSX facilities would be required to maintain the structural integrity and provide outlet protection of this CSO, and also access for continued inspection and maintenance activities.

Once the existing wastewater system is fully modeled, a plan would be developed to mitigate the impacts from the expansion of the rail facility. Measures to reduce or eliminate stormwater entering into the wastewater system while keeping the post-construction flow rate to that of the pre-construction rate would be implemented.

3.7.3. Industrial Wastewater

Per BWSC regulations, there would be no industrial wastewater produced at South Station as part of this project. Neither coach washing nor heavy maintenance are proposed at the layover facilities, therefore no industrial wastewater permits are required.

3.8. Transportation

This section describes the various track alternative configurations considered for the SSX project, as well as a description of the project's layover facilities. The following additional information requested by the Secretary's Certificate is summarized below and detailed in Appendix D, *Track Configuration Alternatives Analysis - Tier 2 Screening Technical Report*:

- A description of how each modeled alternative would meet Amtrak and the MBTA's future service plans, project OTP and delay goals, and allow parallel moves between Tower 1 Interlocking and the terminal (Section 3.8.2 and Appendix D);
- An evaluation of the impact of the modeled alternatives on existing infrastructure, construction staging, capital and maintenance costs, and operations (Section 3.8.2 and Appendix D);
- An assessment of platform capabilities and berthing abilities, a description of how platforms may or may not meet established MBTA and Amtrak requirements for longer trainsets, and potential impacts to future operations and service capabilities (Section 3.8.2 and Appendix D);
- An analysis of potential design modifications to extend platform lengths (Section 3.8.2 and Appendix D);
- A discussion of how the preferred interlocking design would eliminate or reduce delays in a scenario where a locomotive becomes disabled within its trackwork (Section 3.8.2 and Appendix D);
- An explanation for the perceived discrepancy between increases in track layout capacity and future ridership projections (Section 3.8.3);
- A discussion of the expanded assessment of preferred layover facility operations at Widett Circle, BPY, and Readville – Yard 2 which supported the selection of the preferred layover sites (Section 3.8.4);
- An explanation of how the location and operations at any of the potential layover facility sites would impact Main Line services for Amtrak, the MBTA and freight services due to necessary train deadheading and midday storage requirements (Section 3.8.5);
- Identification of proposed maintenance or other rail-related operations that would be undertaken at each layover facility (Section 3.8.6); and
- A phasing plan that addresses sequencing and timing of the potential layover facility sites based on operational need and available storage capabilities (Section 3.8.7).

3.8.1. Impact Summary

This section presents projected ridership at South Station and assesses transportation system impacts associated with the project alternatives. Future conditions are presented for 2025, the project's approximate opening year; and 2035, the horizon year.

Ridership

In 2025, total South Station ridership (Amtrak intercity rail; MBTA commuter rail, rapid transit and local bus; and intercity/commuter bus) for the project would increase by approximately 11% over 2025 No Build condition ridership. In 2035 ridership would increase by approximately 13% over 2035 No Build condition ridership.

Transit Capacity

The project would meet the MBTA's Service Delivery Policy of not increasing crowding impacts to rapid transit or local bus routes over those expected under the No Build Alternative. For commuter rail, 2035 passenger loading on the outbound Canton/Stoughton/South Coast Rail Line is projected to exceed the MBTA Service Delivery Policy's acceptable level of crowding during the peak evening hour. Over the entire three-hour evening peak period, however, there would be more than sufficient capacity to accommodate the projected passenger load demands. Project-related ridership increases at stations in the Downtown core (Park Street, Downtown Crossing, Government Center and State Street) would be

imperceptible. The project would result in a 2% to 4% increase in daily Silver Line platform activity at South Station (measured in passenger boardings and alightings) above the 2035 No Build Alternative levels. The project would increase passenger activity on South Station's Red Line platforms by up to 6% above No Build Alternative levels.

3.8.2. Terminal Track Configuration Alternatives Analysis

MassDOT conducted a Tier 1 screening analysis of four terminal track configuration alternatives (Alternatives 1 through 4) for the DEIR. The Tier 1 analysis included five rating criteria: platform accessibility from each service line, platform berthing lengths, infrastructure maintenance requirements, constructability, and capital cost. Due to the major impacts to existing infrastructure and challenges that would be encountered throughout the construction period, Alternatives 1 and 4 were deemed "not feasible" and were dismissed from further consideration. Alternatives 2 and 3 advanced to the Tier 2 screening analysis (Figures 3-15 and 3-16). Both alternatives are equal in environmental impacts. The results of this Tier 2 analysis is summarized in the following section and discussed in greater detail in Appendix D, *Track Configuration Alternatives Analysis – Tier 2 Screening Technical Report*. Alternatives 2 and 3 were further evaluated base d on the following criteria:

- Platform Rating: Including platform accessibility by each service route and ability of a platform to accommodate Amtrak and MBTA berthing requirements.
- Operations Rating: Measured by the ability to accommodate future service plans and to meet OTP and delay goals.
- Constructability Rating: Measured by the degree to which the alternatives would minimize impacts to existing infrastructure and minimize disruption to passenger service.
- Capital Cost Rating: Measured by order-of-magnitude costs for the construction of each alternative.
- Maintenance Cost Rating: Measured by the level of overall maintenance required for the special trackwork at Tower 1 Interlocking for each alternative.

MassDOT selected Alternative 3 as the preferred track configuration alternative to advance to preliminary engineering, based on the results of the Tier 2 screening analysis, as well as input from project stakeholders. The Alternative 3 terminal track layout is illustrated in Figure 3-16. Alternative 3 would maintain the existing platform configuration at South Station and expand the terminal track configuration to the east with four new platforms and seven new tracks parallel to the existing tracks. Existing platforms would remain at their current width of 17 feet – 6 inches and the new platforms would be 26 feet wide to meet current NFPA and ADA standards. The existing Platform G would require extensive lengthening modifications, but all other existing platforms would not require modifications. This alternative would allow for the longest platform length of 1,085 feet, with the shortest platform length being 708 feet.

MassDOT anticipates that several berthing tracks would be lengthened through standard upgrades and design modifications. Two design modifications may be requested as part of the project to enhance platform capabilities and accommodate berthing length requirements. One design modification would locate the locomotive and a portion of the first coach beyond the end of the platform. The second platform lengthening modification includes using a fixed-type bumping post to replace some of the longer hydraulic bumping posts in use today. Figure 3-16 shows 14 berthing tracks would accommodate MBTA desired length (850 feet) and three berthing tracks would accommodate Amtrak desired length (1,050 feet).

One of the main benefits of Alternative 3 is that there would be minimal impact to the Tower 1 Interlocking track configuration. Additional terminal tracks are accommodated by adding special trackwork to the existing interlocking with minimal impact to existing operations. In addition to reducing the construction staging impacts, this alternative would provide the maximum platform accessibility. This increased flexibility over the existing infrastructure allows for greater route options for dispatchers in the event of delays.

In addition to preserving the existing platforms and tracks, Alternative 3 avoids impact to the existing bus terminal and minimizes the impact to the future bus expansion foundations and columns. The bus terminal is close to capacity today and there are plans to expand it in the future. By expanding the rail capacity without impacting the bus expansion, this alternative increases the opportunities for multimodal connections; in addition, all existing and new platforms could have direct access to the bus terminal as well as other modes available at South Station. This alternative also allows for the opportunity for future joint development along Dorchester Avenue as the new proposed terminal expansion does not occupy all of the terra firma adjacent to the street.

The proposed 20-track South Station layout envisions infrastructure that can support up to seven trains moving simultaneously through the Tower 1 Interlocking area. This proposed layout reduces the number of conflicting movements through the terminal area by making it possible for most trains to use the approach interlockings at Cove and Broad, thereby allowing faster and more efficient crossover moves in preparation of berthing at station platforms. The Cove Interlocking on the NEC allows crossovers to occur at 20 to 30 mph, versus the speed of 10 mph in the Tower 1 Interlocking area, making the necessary crossover movements more efficient. The proposed universal interlocking at Broad Interlocking would push the converging movements to an area of higher-speed crossovers and away from the Tower 1 Interlocking area.

The most substantial modification would be at Broad Interlocking with the introduction of a third running track. This running track would contain an approximately 850-foot section between Broad and Tower 1 Interlockings that would provide sufficient space to stage one trainset outside of Tower 1 Interlocking. This would help with maintaining speed and maximizing efficient train movements through the Tower 1 Interlocking. Other improvements at Broad Interlocking would include the installation of new universal crossovers on the north end of the interlocking and maintain moves to the Wye track and Service and Inspection (S&I) Facility. A new yard lead would be established and the MBTA's S&I facility yard tracks would be realigned. The proposed track realignment of the Fairmount Line/Dorchester Branch may require a partial acquisition of the Boston Department of Public Works (DPW) property and may impact the garage access ramp. Further discussion of the proposed interlocking improvements is provided in Appendix D, *Track Configuration Alternatives Analysis – Tier 2 Screening Technical Report*.

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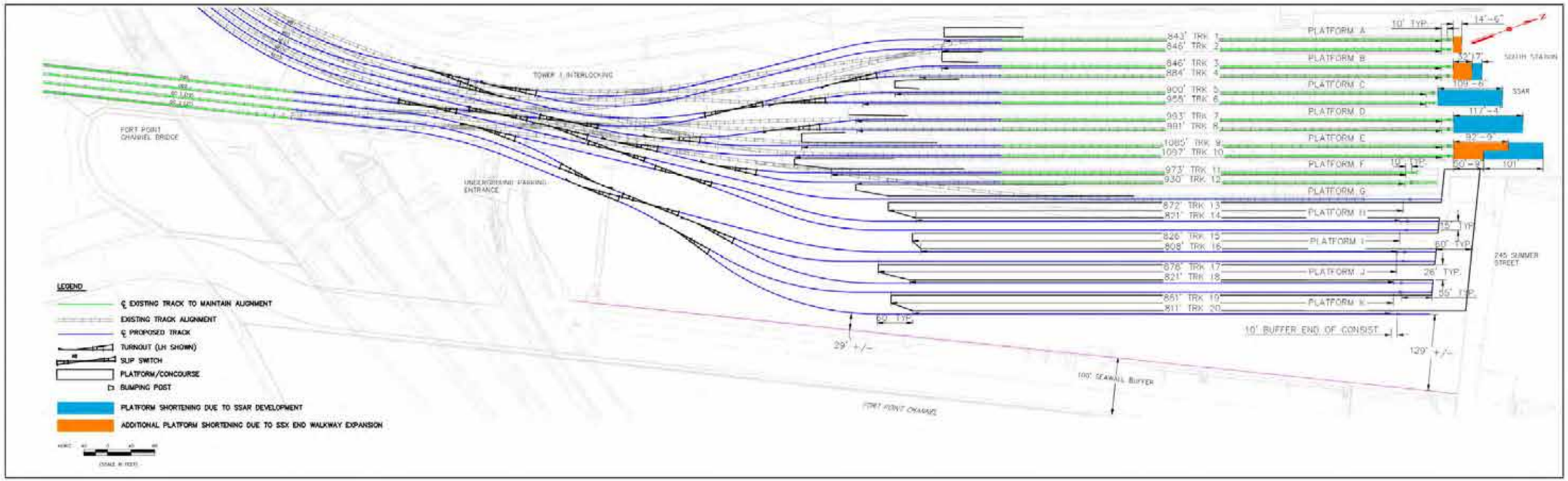

Figure 3-15 —Constrained Rail Alternative 2 - Streamline Operations

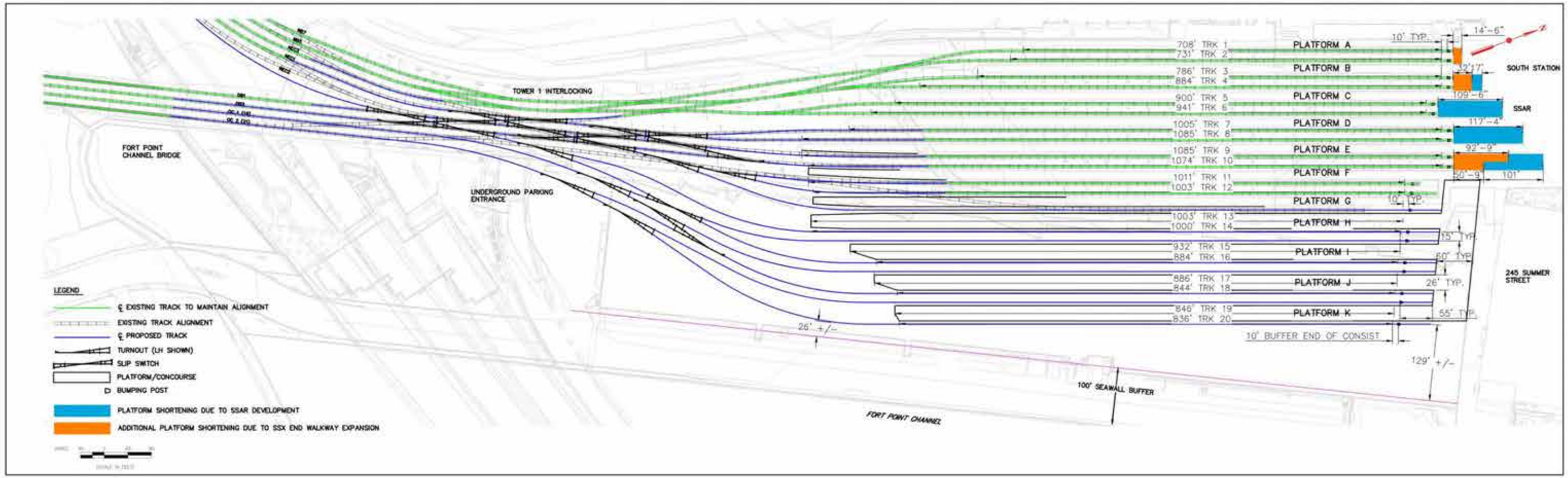

Figure 3-16 — Constrained Rail Alternative 3 – Minimize Disruptions to Operations

3.8.3. Track Layout Capacity and Future Ridership

The Secretary's Certificate requested an explanation of the perceived discrepancy between the proposed number of additional tracks and future ridership projections. As described in the DEIR, an analysis was performed to determine the maximum throughput at a reconfigured Tower 1 Interlocking given its physical constraints, as well as the optimal track configuration at South Station to maximize capacity. The analysis concluded that, based on the throughput that could be supported through a reconfigured Tower 1 Interlocking, a total of 20 platform tracks at South Station (which would require the addition of seven platform tracks to the existing station) would provide the optimum configuration to maximize capacity.

For project planning purposes, MBTA South Side commuter rail service levels were projected for the 2035 horizon year. Amtrak also provided projected 2035 horizon year service levels for intercity rail service. These service plans do not necessarily represent the maximum number of trains that could be accommodated at an expanded South Station with 20 platform tracks. Both MBTA commuter rail and Amtrak intercity ridership projections were based on the developed 2035 horizon year service plans, the markets served by each rail service, and the capacities of the trains, such as the lengths and configurations (i.e. bi-level vs. single level coaches), that would be provided to these markets.

3.8.4. Preferred Layover Facility Operations Assessment

During the DEIR, MassDOT evaluated combinations of BPY (to the west of South Station) and Widett Circle and an expanded Readville – Yard 2 (to the south of South Station) based on layover capacity, program needs, and operational performance. BPY is now subject to environmental review as part of the I-90 Allston Interchange project (EEA No. 15278). The I-90 Allston Interchange project is further refining the concept design and environmental evaluation of BPY, which is occurring concurrently with the SSX project. For environmental review of the SSX project, BPY is assumed to be in use as a midday layover facility prior to 2035. This does not obviate the need for additional midday layover facilities for the SSX project. As such, Widett Circle and an expanded Readville – Yard 2 have been selected as the preferred layover sites.

In order to optimize South Station operations, MBTA revenue trains entering South Station from the south ideally would lay over on the south side. Likewise, MBTA revenue trains entering from the west ideally would lay over on the west side. All Amtrak trains enter the South Station Terminal from the west and lay over at the existing Southampton Street Yard on the south and would continue to do so in the future. While there would always be a need for some trains to cross over between the south and west at Tower 1 Interlocking, providing additional MBTA midday layover facilities to the west and south would considerably increase South Station's capacity and efficiency of operations. Operational benefits would include:

- Allowing Amtrak trains nearly exclusive use of the central platforms at South Station;
- Allowing for a greater number of trains to move in and out of the terminal; and
- Reducing conflicting movements at Tower 1 Interlocking that consume critical railroad operational capacity.

3.8.5. Layover Location and Operations Impacts on Rail Services

As discussed in the FEIR Appendix E, *Rail Operations Analysis Technical Report*, the operations analysis conducted for the SSX project evaluated all train moves and evaluated impact to all rail services in and out of South Station. In addition to all revenue train moves, the simulation models also included all MBTA and Amtrak non-revenue train movements between South Station and the layover facilities. Future freight operations, assumed to operate as they do today within the project study area, would not be

negatively impacted by the proposed future service and infrastructure improvements. The results of the operations analysis indicate that the proposed infrastructure would support proposed future operations and meet or exceed the MBTA Commuter Rail Schedule Adherence Standard, exceeding the OTP threshold of 95% of all trips departing and arriving at terminals within five minutes of scheduled departure and arrival times. The results also meet or exceed Amtrak's 2030 OTP target for Acela Express service and Northeast Regional service (95%).[4] These results indicate the proposed terminal infrastructure is robust and flexible enough to provide reliable service given the large increase in future 2035 trip volumes.

3.8.6. Activities at Layover Facilities

The purpose of the Widett Circle and expanded Readville – Yard 2 midday layover facilities is to provide a location to stage MBTA's commuter rail trains and relieve train crews between revenue runs, typically during off-peak hours in the midday period. The average layover duration is approximately 4 hours and 30 minutes. These facilities also provide a place for storing essential supplies for the locomotive such as fuel, sand, lubricants, and coolants; and they provide for sanitary systems maintenance and water for the coaches equipped with restrooms. The interior of each coach is cleaned and minor running repairs are performed while each train is out of service. Examples of running repairs include replacement of lights, brake shoes, air hoses, and HVAC components; fixing jammed doors and repairing seats; and checking and topping off fluids as needed to support train operations. No new heavy maintenance functions are proposed at Widett Circle or Readville – Yard 2. Routine service, inspection, and repairs are conducted at the MBTA's South Side S&I facility. Extensive equipment repairs are conducted at the MBTA's Commuter Rail Maintenance Facility located on the North Side of the MBTA Commuter Rail System.

3.8.7. Layover Phasing Plan

Because the MBTA's needs for future midday layover will grow over time, there are opportunities to phase the construction of the proposed layover facilities to meet existing layover needs and as MBTA's commuter rail services are expanded in the future. MassDOT assumes BPY is constructed prior to 2035, which would help support short-term south side midday layover capacity and maintenance needs. MassDOT anticipates construction at the South Station site and layover facility sites could advance independently and on separate timelines. Service enhancements to passenger rail service are anticipated by 2035, which could be supported by the expansion of Readville – Yard 2, followed by the full buildout of Widett Circle as demand increases.

3.9. Traffic – Vehicles, Pedestrians, and Bicycles

This section discusses the impacts of the project on vehicular traffic, pedestrians, and bicyclists, and also provides the following information requested in the Secretary's Certificate:

- A reevaluation of the feasibility of additional intersection mitigation measures to further reduce the number of intersections in the study area that currently, or in the future, operate at Level of Service (LOS) E and F. If additional mitigation is not proposed, the FEIR should discuss why mitigation measures are infeasible (Section 3.9.2);
- An update of proposed Transportation Demand Management (TDM) measures, traffic-related elements of the proposed Construction Management Plan (CMP), or other relevant traffic mitigation measures as necessary to reflect final design elements of the project (Section 3.9.3);

[4] *Amtrak Intercity Passenger Rail On-Time Performance: Twentieth Quarterly Report to Congress*. February 2013. Viewed June 12, 2013 at www.fra.dot.gov

- Details regarding traffic monitoring (Section 3.9.4);
- Additional data regarding trip diversion to Dorchester Avenue (Section 3.9.5);
- Graphics identifying proposed routes to and from South Station from key roadways and locations (Section 3.9.5);
- A discussion of curbside drop-off/pick-up area design (Section 3.9.6);
- The use of Dorchester Avenue by MBTA buses (Section 3.9.7);
- South Station pedestrian and bicycle connections between South Station and surrounding areas (Section 3.9.8);
- Details regarding bicycle parking (Section 3.9.9);
- A discussion of how public realm infrastructure improvements would be maintained (Section 3.9.10); and
- A discussion of any potential water taxi service (Section 3.9.11).

3.9.1. Impact Summary

MassDOT analyzed the operations of 21 intersections in the South Station study area and two intersections each in the Widett Circle and Readville – Yard 2 study areas under the No Build and Build Alternatives. The analysis identified eight intersections, all of which are within the South Station study area, which would benefit from changes to improve traffic flow and increase pedestrian and bicycle mobility.

3.9.2. Intersection Mitigation Feasibility Analysis

LOS is the traffic engineering metric used to denote the different vehicle[5] operating conditions that occur on a given roadway or intersection under various volume loads. LOS A represents the best operating conditions, while LOS F represents the worst operating conditions. Typically, an overall LOS D or better is considered acceptable for motor vehicles in an urban environment. In some cases, LOS E conditions are acceptable for motor vehicles in an urban environment in order to accommodate pedestrians or bicyclists.

To both address LOS deficiencies as well as improve conditions for motor vehicles, pedestrians, and bicycles, mitigation would consist of several measures, including:

- Providing dedicated curbside space for taxicabs, passenger drop-off and pick-up, and private shuttles along the reopened portion of Dorchester Avenue to address excessive curbside congestion along Atlantic Avenue;
- Increasing curbside capacity by removing six parking meters from Atlantic Avenue;
- Improving bicycle accommodations on Atlantic Avenue; and
- Upgrading eight intersections (shown in Table 3-7 and Figure 3-17) to improve traffic flow, reduce queuing, and improve pedestrian and bicycle mobility.

These intersection improvements represent opportunities to improve operating conditions and the quality of service for all modes: pedestrians, bicyclists, and motor vehicles. However, as indicated in Table 3-7, not every peak hour LOS E/F operating condition in the study area can be mitigated for motor vehicles.

[5] The DEIR analyzed LOS for vehicles within the study area. While pedestrian LOS was analyzed within South Station itself, it was not analyzed for the traffic study area. Bicycle LOS was not analyzed.

There are intersections in the study area that would continue to operate at LOS E/F during peak hours that cannot be mitigated without impacting accommodations for pedestrians and bicyclists. For example, while adding vehicular travel lanes on Summer Street or Atlantic Avenue would be needed to fully address LOS E/F conditions along this corridor, doing so would result in deteriorated pedestrian mobility due to longer wait and walk times. There is a heavy concentration of pedestrians in the area of South Station. Therefore, peak hour vehicular operating condition performing at LOS E/F is an acceptable tradeoff to maintain safe and efficient pedestrian mobility in the area and avoid favoring the automobile over non-automobile modes. This approach is consistent with the City of Boston's Complete Streets Guidelines[6], MassDOT's Healthy Transportation Compact initiative, and MassDOT's Project Development and Design Guide.

Table 3-7 identifies the eight intersections selected for implementation of mitigations measures, and compares their overall intersection LOS under No Build and Build Alternatives prior to mitigation. There is one location, Summer Street at Dorchester Avenue, where the vehicle LOS decreases slightly during the morning peak hours (from LOS C to LOS D) due to the additional signal time that is provided to pedestrians and bicyclists under the mitigated conditions. Although the vehicle LOS decreases slightly, the intersection will continue to operate at an acceptable LOS D or better.

Table 3-7 — Comparison of No Build and Build Alternative Overall Intersection LOS

	2035 No Build Alternative		2035 Build Alternative[a]		2035 Mitigated Condition	
Intersection	Morning Peak Hour LOS	Evening Peak Hour LOS	Morning Peak Hour LOS	Evening Peak Hour LOS	Morning Peak Hour LOS	Evening Peak Hour LOS
Atlantic Avenue at Summer Street	F	D	F	D	D	D
Purchase Street at Summer Street	D	B	D	B	B	A
Surface Road at Essex Street/Lincoln Street	D	F	C	F	B	E
Summer Street at Dorchester Avenue	E	E	C	C	D[b]	C
Congress Street at Dorchester Avenue	C	C	C	D	C	C
Atlantic Avenue at Kneeland Street	F	E	F	E	E	D
Dorchester Avenue at West Broadway/ Traveler Street	F	E	F	F	D	D
Dorchester Avenue at West 4th Street	E	C	E	E	D	E

[a] Build Alternative LOS is pre-mitigation
[b] Vehicle LOS decreases slightly during the morning peak hours (from LOS C to LOS D) due to the additional signal time that is provided to pedestrians and bicyclists under the mitigated conditions.
Note: LOS = Level of Service

[6] City of Boston Complete Streets Guidelines website: http://bostoncompletestreets.org

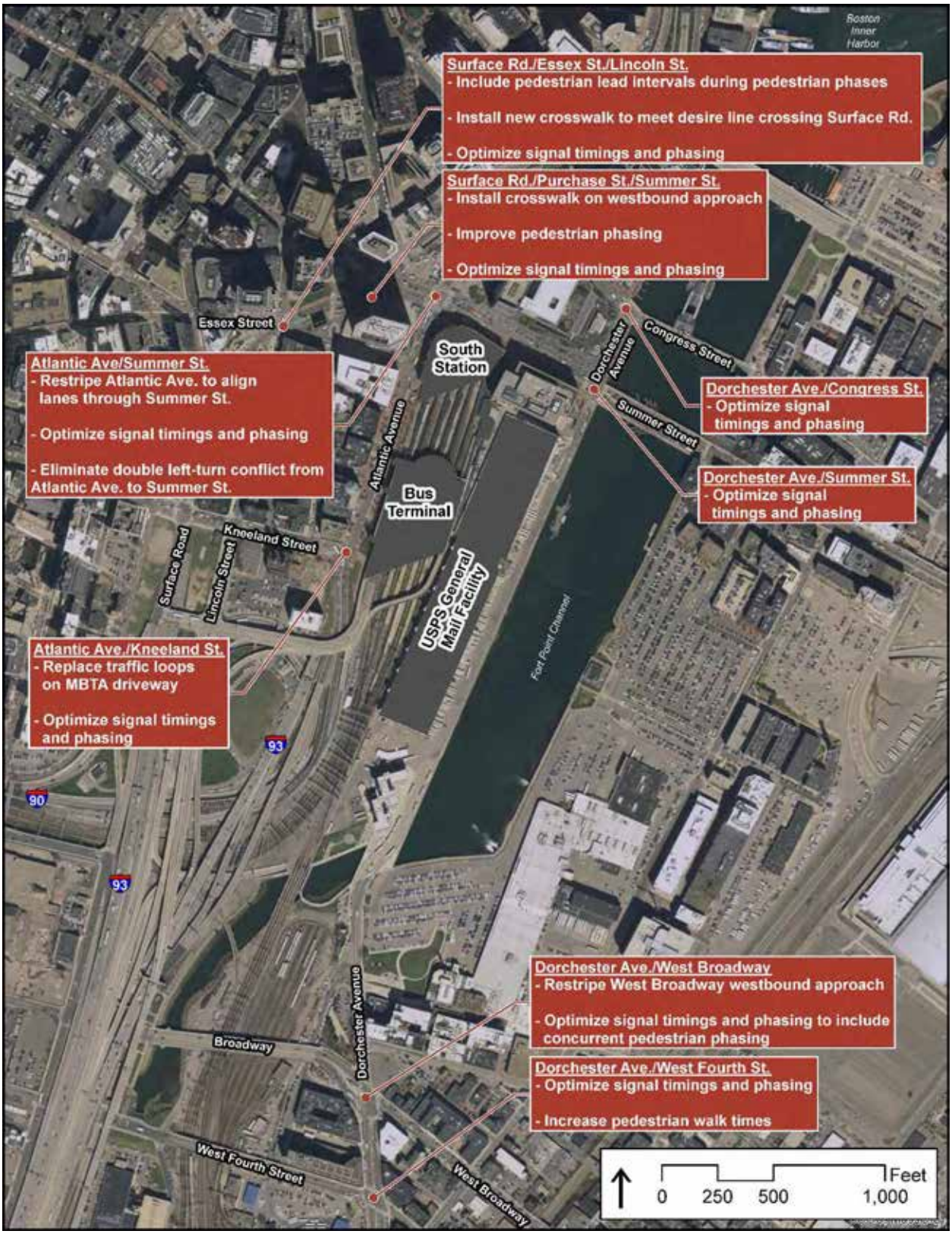
Surface Rd./Essex St./Lincoln St.
- Include pedestrian lead intervals during pedestrian phases
- Install new crosswalk to meet desire line crossing Surface Rd.
- Optimize signal timings and phasing
Surface Rd./Purchase St./Summer St.
- Install crosswalk on westbound approach
- Improve pedestrian phasing
- Optimize signal timings and phasing
Atlantic Ave/Summer St.
- Restripe Atlantic Ave. to align lanes through Summer St.
- Optimize signal timings and phasing
- Eliminate double left-turn conflict from Atlantic Ave. to Summer St.
Dorchester Ave./Congress St.
- Optimize signal timings and phasing
Dorchester Ave./Summer St.
- Optimize signal timings and phasing
Atlantic Ave./Kneeland St.
- Replace traffic loops on MBTA driveway
- Optimize signal timings and phasing
Dorchester Ave./West Broadway
- Restripe West Broadway westbound approach
- Optimize signal timings and phasing to include concurrent pedestrian phasing
Dorchester Ave./West Fourth St.
- Optimize signal timings and phasing
- Increase pedestrian walk times
Boston Inner Harbor
Essex Street
South Station
Dorchester Avenue
Congress Street
Summer Street
Atlantic Avenue
Bus Terminal
Kneeland Street
Surface Road
Lincoln Street
USPS General Mail Facility
Fort Point Channel
93
90
93
Broadway
Dorchester Avenue
West Fourth Street
West Broadway
0 250 500 1,000 Feet

Figure 3-17 — South Station Site - Traffic Mitigation Measures

3.9.3. Transportation Demand Management Commitments

In addition to intersection improvements, and consistent with MassDOT's efforts to reduce automobile dependency, transportation demand management (TDM) commitments for the SSX project would include the following:

- Incorporate bicycle parking in the new headhouse on Dorchester Avenue;
- Participate in the U.S. EPA SmartWay Transport Program to increase energy efficiency and reduce greenhouse gas emissions;
- Provide electronic signage displaying transit schedule information;
- Accommodate curbside space for a shuttle bus stop along Dorchester Avenue for shuttle buses that currently serve the South Boston Waterfront/Innovation District;
- Collaborate with the City of Boston to improve bicycle accommodations along Atlantic Avenue from Kneeland Street to Summer Street; and
- Prepare a CMP for BTD to minimize disruption in the area throughout construction.

Details of each element of the TDM plan for the project would be refined throughout the engineering design phase. MassDOT would coordinate with the City of Boston to identify elements of the CMP to minimize disruption to transit users, pedestrians, bicyclists, and drivers in the area throughout construction.

3.9.4. Traffic Monitoring

Since the proposed project does not include joint development, MassDOT no longer proposes parking at the site. Traffic monitoring activity would apply to construction phases of the project and not to building occupancy milestones as it normally would for a development project. During construction, a Construction Management Plan would be prepared for approval by the Boston Transportation Department (BTD) to minimize disruption to transit users, pedestrians, bicyclists, and drivers in the area.

3.9.5. Trip Diversion to Dorchester Avenue

The project is expected to reduce curbside traffic on Atlantic Avenue due to the diversion of a portion of this traffic to Dorchester Avenue. Determining how much South Station traffic would shift from the Atlantic Avenue curb to Dorchester Avenue was based on several factors, such as curbside capacity (number of spaces), curbside demands (pick-up, drop-off, and taxicabs), and traffic patterns to South Station as illustrated in Figure 3-18. Based on a review of the curbside trip origins and destinations, overlaid onto the key roadways used by South Station traffic, the proposed project is expected to shift 30% to 40% of curbside traffic from Atlantic Avenue to Dorchester Avenue. Detailed information including traffic network diagrams quantifying the shift in vehicle trips is contained in DEIR Appendix 9, *Traffic Analysis Technical Report*.

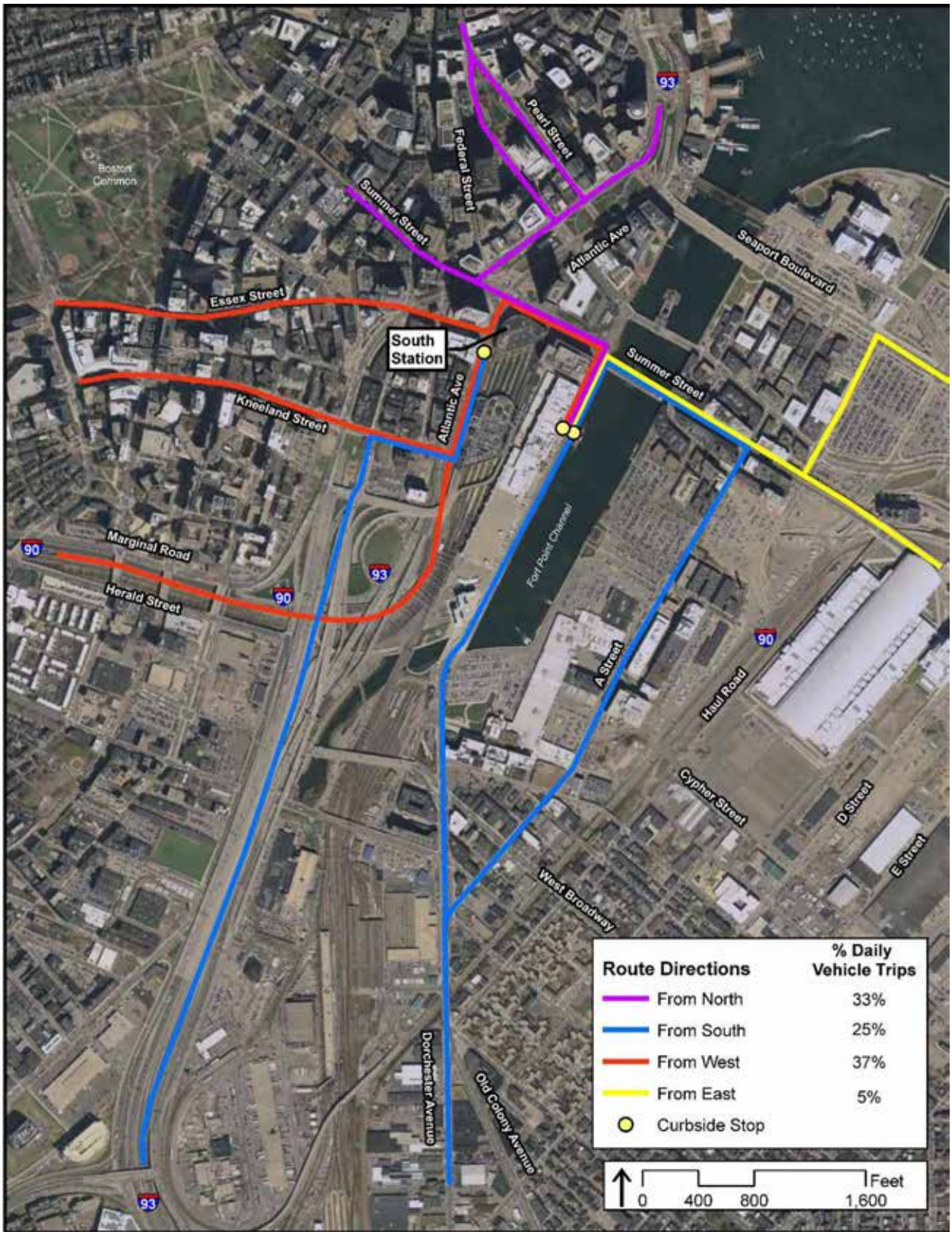

Figure 18 – Proposed Key Routes to South Station

3.9.6. Curbside Drop-Off/Pick-Up Area Design

The cross-section layout and conceptual design for the reopened portion of Dorchester Avenue has been coordinated with City of Boston staff to prioritize safe and efficient accommodations for pedestrians and bicyclists. The cross-section and conceptual alignment for the newly opened portion of Dorchester Avenue prioritizes pedestrian and bicycle accommodations on the Fort Point Channel side of the roadway, separated from the vehicular curbside activity at the expanded headhouse on Dorchester Avenue.

3.9.7. Use of Dorchester Avenue by MBTA Buses

Dorchester Avenue presents an opportunity for MBTA bus service and the potential to add a dedicated stop at the expanded headhouse. The two primary bus stops that serve South Station on Summer Street are heavily utilized. Dorchester Avenue could accommodate direct bus service between South Station and the rapidly growing South Boston Waterfront/Innovation District without requiring buses to enter the congested downtown Dewey Square area. To avoid having to travel through congested Dewey Square, buses from the South Boston Waterfront/Innovation District could divert onto Dorchester Avenue and stop in the vicinity of the new headhouse, then turn around at the I-90 Vent Building if desired by the MBTA. Dorchester Avenue could also present an opportunity to revisit other bus routes in the area to provide a more direct connection to downtown, such as Route 11, which currently travels along the public portion of Dorchester Avenue to Foundry Street before diverting off Dorchester Avenue. MassDOT would continue to coordinate with the MBTA to determine the opportunity of accommodating bus service on the reopened portion of Dorchester Avenue.

3.9.8. Pedestrian and Bicycle Connections

The project includes area-wide enhancements to pedestrian and bicycle connections and the expanded headhouse would incorporate bicycle parking. The reopening of Dorchester Avenue presents an opportunity to extend the existing Harborwalk by approximately one-half mile along the Fort Point Channel. This extension would close one of the last remaining gaps in an otherwise continuous waterfront walkway in Downtown Boston. The reopened segment of Dorchester Avenue would include a new cycle track that is buffered from traffic and parallel to the newly created Harborwalk along the Fort Point Channel. The proposed cycle track would connect with existing bicycle infrastructure and complement future plans by the City, including the South Bay Harbor Trail and the Summer Street Corridor cycle track. There are existing Hubway bicycle sharing stations on Dorchester Avenue, at the end of the South Bay Harbor Trail, on Atlantic Avenue, and on Summer Street, which would complement the new cycle track and plans for bicycle parking within the expanded headhouse.

3.9.9. Bicycle Parking

The approximate size and location of proposed long-term and short-term bicycle parking would be determined as the designs for the headhouse and Dorchester Avenue progress. As part of the design approvals for Dorchester Avenue, the location and size of any new Hubway stations would be reviewed with the City of Boston. A review of bicycle demands in the area and Hubway origin-destination data indicates that a new Hubway station on Dorchester Avenue would be approximately the same size of the existing Hubway station on Atlantic Avenue (47 bicycle slots).

3.9.10. Maintenance of Public Realm Infrastructure

The public realm improvements along Dorchester Avenue, to include the proposed Harborwalk extension and cycle track, would be the responsibility of the City to maintain, or develop maintenance agreements (if desired). Since Dorchester Avenue would be a City-owned public right-of-way, the City would be

responsible for any maintenance and repairs to the hardscape, landscape, drainage systems, pavement markings, lighting, signage, and traffic signals.

3.9.11. Water Transportation

Under Chapter 91, as a nonwater-dependent infrastructure facility, the project is exempt from the regulatory standards at 310 CMR 9.51 (Conservation of Capacity for Water-Dependent Use), 310 CMR 9.52 (Utilization of Shoreline for Water-Dependent Purposes), and 310 CMR 9.53 (Activation of Commonwealth Tidelands for Public Use). Because this project includes transportation improvements only, additional public benefits related to waterfront access and/or water transportation are not required. In the future if private development is proposed, the inclusion of water transportation may be reassessed.

3.10. Climate Change

This section includes a summary of the impacts that climate change is anticipated to have on the project, and also provides the following information requested in the Secretary's Certificate:

- A sensitivity analysis comparing the results of this vulnerability assessment and its associated model, the Boston Harbor Flood Risk Model, with that presented in the DEIR to determine if the extent of potential flooding during the evaluated scenarios encompasses a larger than anticipated area (Section 3.10.1);
- Additional data on the potential depths of inundation within the SSX project area in the 1% annual chance flood event, the 1% annual chance flood event plus two feet of sea level rise, and hurricane modeled events (Section 3.10.1);
- A discussion of how climate change and storm adaptation and resiliency measures would be selected and implemented, either as part of the original project design, or within the design life of the project, with a clear commitment to implementation by MassDOT (Section 3.10.2);
- Consideration of how adaptable the proposed infrastructure would be in the future, and consideration of upfront adaptation measures that would be very difficult to implement once the infrastructure is in place (Section 3.10.3);
- An explanation of how climate change adaptation and resiliency measures are incorporated into the stormwater management system (Section 3.10.4); and
- A description of the nature, potential scope, and location of the impacts of sea level rise and coastal storms on the three Combined Sewer Overflow (CSO) outlets to Fort Pint Channel near South Station. Potential mitigation measures to minimize seawater entering back into the CSO lines, as well as the anticipated responsible party, are identified (Section 3.10.5).

3.10.1. Vulnerability Assessment Comparison

The DEIR provided a climate change and adaptation analysis, including assessment of potential risks associated with a two-foot rise in sea level. It also included an analysis of hurricane modeling. The analysis in this FEIR summarizes the results presented in the DEIR; provides updates based on newly available flood information from FEMA;[7] provides results of the MassDOT-Federal Highway Administration (FHWA) Boston Harbor Flood Risk Model (BH-FRM) analysis;[8] and responds to specific requests for clarification and expansion from the DEIR certificate and the comment letters. Tables 3-8 and

[7] FEMA, Flood Insurance Rate Maps for Suffolk County Massachusetts, Revised March 16, 2016.
[8] MassDOT-FHWA, Pilot Project Report: Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options for the Central Artery, June 2015.

3-9 provide comparisons of the components of the flood vulnerability studies conducted for the DEIR and the FEIR.

Table 3-8 — Flood Vulnerability Comparison: South Station

		South Station		
	Source	BFE (NAVD88)	SFHA Area[a]	Flood Depths
DEIR	2013 Preliminary FIRMs	10-13 ft	2.9 acres	N/A
	2013 Preliminary FIRMs + 2' SLR	12-15 ft	38 acres	N/A
FEIR	2016 FIRMs	10 ft	3 acres	N/A
	2016 FIRM BFEs + 2' SLR	12 ft	28 acres	N/A
	BH-FRM 2013	N/A	N/A	Negligible
	BH-FRM + 0.62' SLR (2030)	N/A	N/A	Negligible
	BH-FRM + 3.2' SLR (2070)	N/A	N/A	0.5 – 2.5 ft

Notes: BFE = Base Flood Elevation; NAVD88 = National Vertical Datum of 1988; SFHA = Special Flood Hazard Area; FIRM = Flood Insurance Rate Map; SLR = sea level rise.
a Area subject to the 1% annual chance flood.

Table 3-9 — Flood Vulnerability Comparison: Widett Circle

		Widett Circle		
	Source	BFE (NAVD88)	SFHA Area[a]	Flood Depths
DEIR	2013 Preliminary FIRMs	Not Impacted	Not Impacted	N/A
	2013 Preliminary FIRMs + 2' SLR	14 ft	30 acres	N/A
FEIR	2016 FIRMs	10 ft	26 acres	N/A
	2016 FIRM BFEs + 2' SLR	12 ft	30 acres	N/A
	BH-FRM 2013	N/A	Not Impacted	Not Impacted
	BH-FRM + 0.62' SLR (2030)	N/A	Not Impacted	Not Impacted
	BH-FRM + 3.2' SLR (2070)	N/A	30 acres	1.5 – 2.0 ft

Notes: BFE = Base Flood Elevation; NAVD88 = National Vertical Datum of 1988; SFHA = Special Flood Hazard Area; FIRM = Flood Insurance Rate Map; SLR = sea level rise.
a Area subject to the 1% annual chance flood.

DEIR Analysis: Summary

Sea levels are rising in Boston Harbor and across the globe, as evidenced through empirical data. In order to assess future risk and planning for rising seas, Massachusetts Office of Coastal Zone Management (CZM) recommends selecting specific sea level rise scenarios. As directed by the Secretary of EEA, the DEIR assessed the impacts of a two-foot sea level rise on the SSX project, which is consistent with planning for a project with a design life of 50 years. To assess the project's vulnerability to flooding, floodplains in the study areas were identified using both the 2009 and preliminary 2013 Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) and Flood Insurance Study (FIS), as well as a two-foot sea level rise added to the base flood elevations (BFEs)[9] presented in those documents.

South Station

For the DEIR, the project site's BFEs were evaluated at heights of 10 to 13 feet.[10,11] The existing ground elevation at South Station varies from approximately nine to 16 feet. This indicates that a portion of the South Station site is already vulnerable to flooding without any projected sea level rise. The DEIR found that at these elevations approximately 2.9 acres of the site are within the 1% annual chance floodplain,

[9] A base flood elevation (BFE) is the elevation to which floodwater is anticipated to rise during the base flood, which FEMA FIRMS identify as the flood having a one percent change of being equaled or exceeded in any given year, commonly referred to as the "100-year flood."
[10] All elevation references are based on the North American Vertical Datum of 1988 (NAVD 88).
[11] Federal Emergency Management Agency. Preliminary Flood Insurance Study, Suffolk County Massachusetts, November 15, 2013.

and approximately 18.9 acres are within the 0.2% annual chance floodplain. Adding two feet to the flood elevations to reflect a future sea level rise scenario would amplify the risk at South Station and increase flood elevations to a range of 12 to 15 feet. An elevation of 14 feet for the 1% annual chance flood was ultimately selected for future sea level rise analysis. The extent of potential flooding at the South Station site under this scenario would encompass approximately 38 acres of the SSX project footprint, representing nearly complete inundation of the site and infrastructure.

Widett Circle

The DEIR indicated that the current 1% annual chance flood event does not reach the Widett Circle layover facility site by an overland connection. However, there could be risks of flooding through unknown underground connections, such as storm drainage pipes. A future two-foot rise in sea level, with a corresponding 1% annual chance flood elevation of 14 feet as presented in the DEIR, would result in flooding over a direct overland connection to Fort Point Channel. During the 1% annual chance flood event, the Widett Circle layover facility project footprint would be completely inundated.

Readville – Yard 2

The Readville – Yard 2 layover facility site is located approximately six miles inland from Boston Harbor and is not within a coastal flood hazard area. Based upon the distance of the site from the ocean, the site's elevation, and the presence of downstream dams, it is anticipated that a two-foot rise in sea level would not impact the sites coastal flooding characteristics.

DEIR Analysis: SLOSH Model

Application of the Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model was described in DEIR Section 5.3.4, Hurricane Surge. The SLOSH model's Hurricane Surge Inundation Maps show areas of coastal Massachusetts that would become inundated based upon different categories of hurricanes. The maps show that a Category 2 hurricane would inundate the majority of the area in and around South Station, and a Category 1 hurricane would inundate the entire area surrounding Widett Circle. These maps are based on current sea level conditions only and do not account for future sea level rise. Hurricane surge elevations from the Massachusetts Hurricane Evacuation Study are not published, and as a result predicted future surge conditions due to sea level rise were qualitative in the DEIR study. Because elevations are not available for flooding associated with different hurricane intensities, effects due to a projected two-foot sea level rise were estimated. With a rise in sea level, hurricane surge inundation scenarios are expected to increase to some proportionate elevation and horizontal extent, similar to the anticipated effects of projected sea level rise upon 1% annual chance flood events.

FEIR Analysis: Updated FEMA FIRMS

Following completion of the DEIR, the preliminary 2013 FIRMs were appealed and removed from circulation. In 2015 FEMA released updated FIRMs for Suffolk County that took effect March 16th, 2016.

South Station

The 2016 FIRMs update the BFEs for the portions of Fort Point Channel adjacent to South Station. Of particular note, the preliminary 2013 FIRMs reported varied flood depths, whereas the updated BFEs are uniform for this entire area at an elevation of 10 feet. Based upon this new floodplain data, approximately 3 acres of the South Station project footprint would be inundated by the 1% annual chance flood. Figure 3-19 provides a visual representation of the areas at risk of inundation during the 1% annual chance flood. Adding two feet to the flood elevation to reflect a future sea level rise scenario would amplify the risk at South Station and increase flood elevation to approximately 12 feet. Figure 3-20 presents the extent of potential flooding at the South Station site under this scenario. In the absence of

mitigation, the 1% annual chance floodplain would encompass approximately 28 acres of the South Station project footprint.

Widett Circle

The 2016 FIRMs also indicate that the current 1% annual chance flood event does not reach the Widett Circle layover facility site by an overland connection. As presented in Figure 3-19, the 0.2% annual chance flood event would inundate the entire project footprint. As shown in Figure 3-20, with a two-foot rise in sea level, the 1% annual chance flood event has a much larger extent, and would completely inundate the entire Widett Circle layover facility project footprint.

Readville – Yard 2

As described in the DEIR Results Summary above, Readville – Yard 2 site is not within the coastal zone. FIRM panels for this area were not recently updated; therefore no new data exist for the area in the vicinity of Readville – Yard 2.

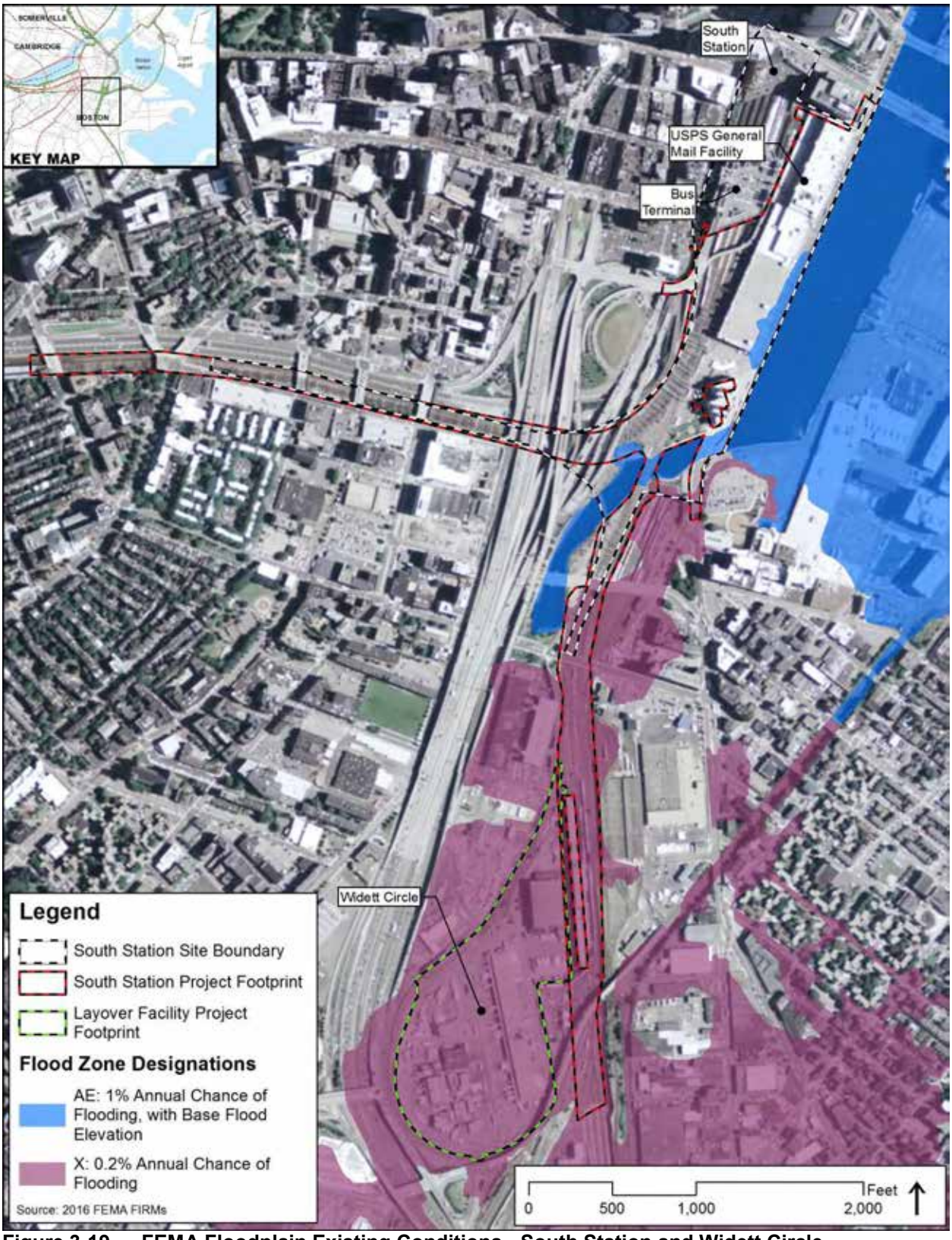

Figure 3-19 — FEMA Floodplain Existing Conditions - South Station and Widett Circle

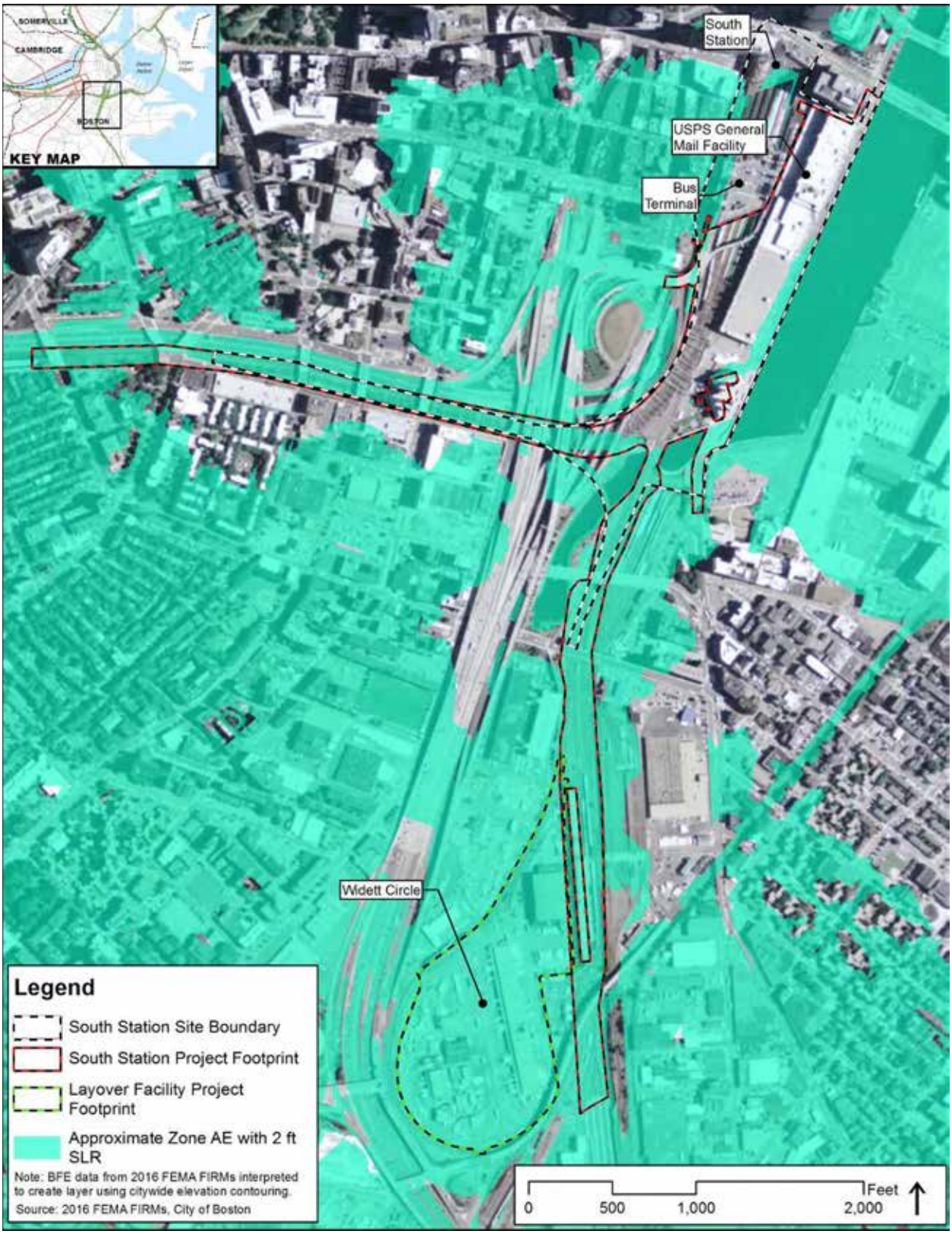

Figure 3-20 — Area Susceptible to Flooding with Two Feet of Sea Level Rise

FEIR Analysis: Boston Harbor Flood Risk Model

In 2015, MassDOT completed a pilot project report titled *Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options for the Central Artery*. This report provides an evaluation and analysis of the vulnerability of Boston's Central Artery to sea level rise and storm-driven flooding scenarios using the newly-developed BH-FRM. The model provides information on both flooding extent and flood depths for current and future conditions. Consistent with the Secretary's request, this FEIR applies the model to the project sites, and compares the modeled outputs to the 2016 FIRMs.

South Station

Figure 3-21 shows the extent of the 1% coastal flood exceedance probability (CFEP) at three different time periods for the area around South Station as modeled by BH-FRM. The current (2013) 1% CFEP event is analogous to FEMA's 1% annual chance flood event. Similar to the 2016 FIRMs, the BH-FRM depicts a scenario wherein flood waters would enter the South Station site along Fort Point Channel's western seawall. The BH-FRM also offers results for sea level rise over the coming decades of 0.62 feet (2030) and 3.2 feet (2070). The 0.62-foot SLR scenario projects flooding conditions similar to those of the 2013 CFEP maps and 2016 FIRMs. However, the 3.2-foot SLR scenario illustrates significant changes to the potential flooding extent. A 3.2-foot rise in sea level would cause inundation over much of the South Station project footprint, as well as much of the areas surrounding South Station, during the 1% annual chance flood event.

The BH-FRM also provides data on flooding depths for the 1% CFEP event. As presented in Figure 3-22 and Figure 3-23, shallow flooding would occur within the South Station project footprint during the 1% CFEP under current conditions, as well as in 2030 with a projected rise in sea levels of 0.62 feet. Flood depths become a greater concern under the conditions of a 3.2-foot rise in sea levels by 2070. As presented in Figure 3-24, portions of the South Station platform areas could flood to a depth of between 0.5 feet and 1.5 feet. The portion of the South Station project footprint including tracks extending both west away from South Station and south towards Widett Circle could flood to a depth of between 1.0 and 2.5 feet.

Widett Circle

A comparison of the 2016 FIRMs and the BH-FRM presents similar outcome for Widett Circle. As presented in Figure 3-22, no flooding would occur at Widett Circle as a result of a 1% CFEP. Figure 3-23 indicates that the 0.62-foot SLR scenario does not result in increased flooding conditions. However, the 3.2-foot SLR scenario would affect Widett Circle during the 1% CFEP. A 3.2-foot rise in sea level would inundate the entire Widett Circle project footprint, as well as much of the area surrounding Widett Circle. As presented in Figure 3-24, the entire project footprint of Widett Circle could flood to depths ranging from 1.5 feet to 2.0 feet during 1% CFEP event with 3.2 feet of SLR.

Tables 3-8 and 3-9 provide a comparison of the flooding characteristics described in the DEIR and FEIR flood vulnerability analyses.

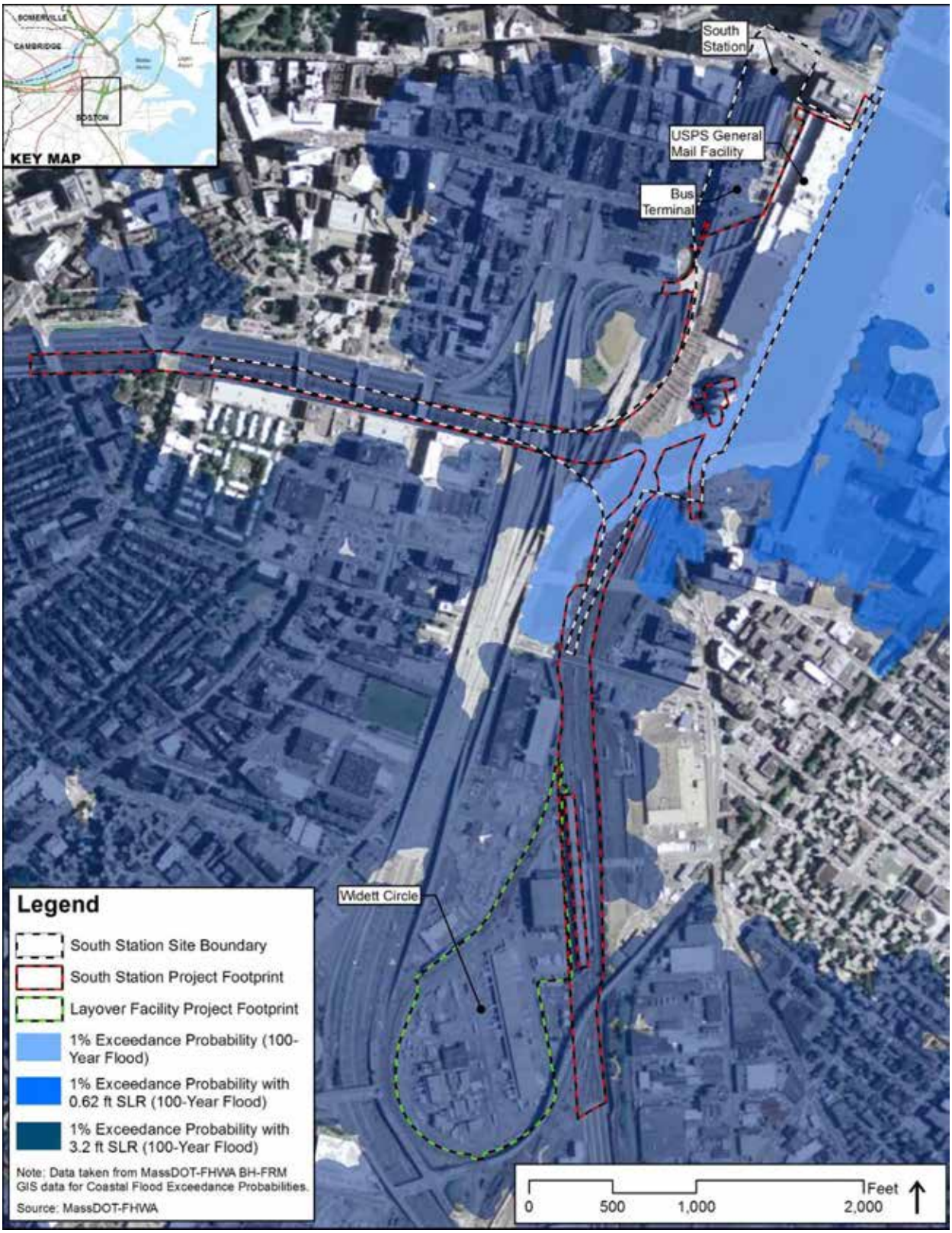

Figure 3-21 — Boston Harbor Flood Risk Model 1% Exceedance 2013, 2030 and 2070

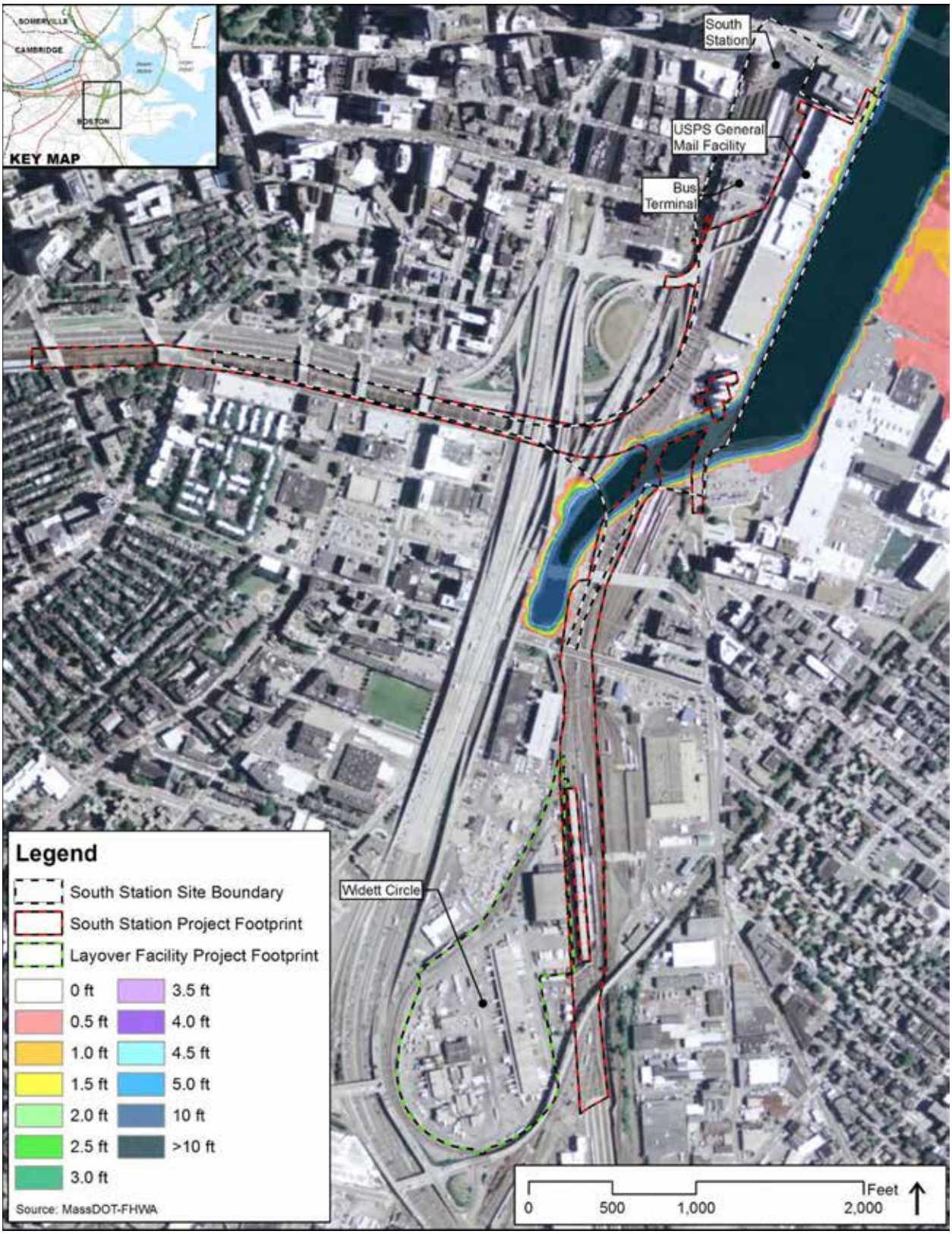

Figure 3-22 — Boston Harbor Flood Risk Model 1% Flood Depths 2013

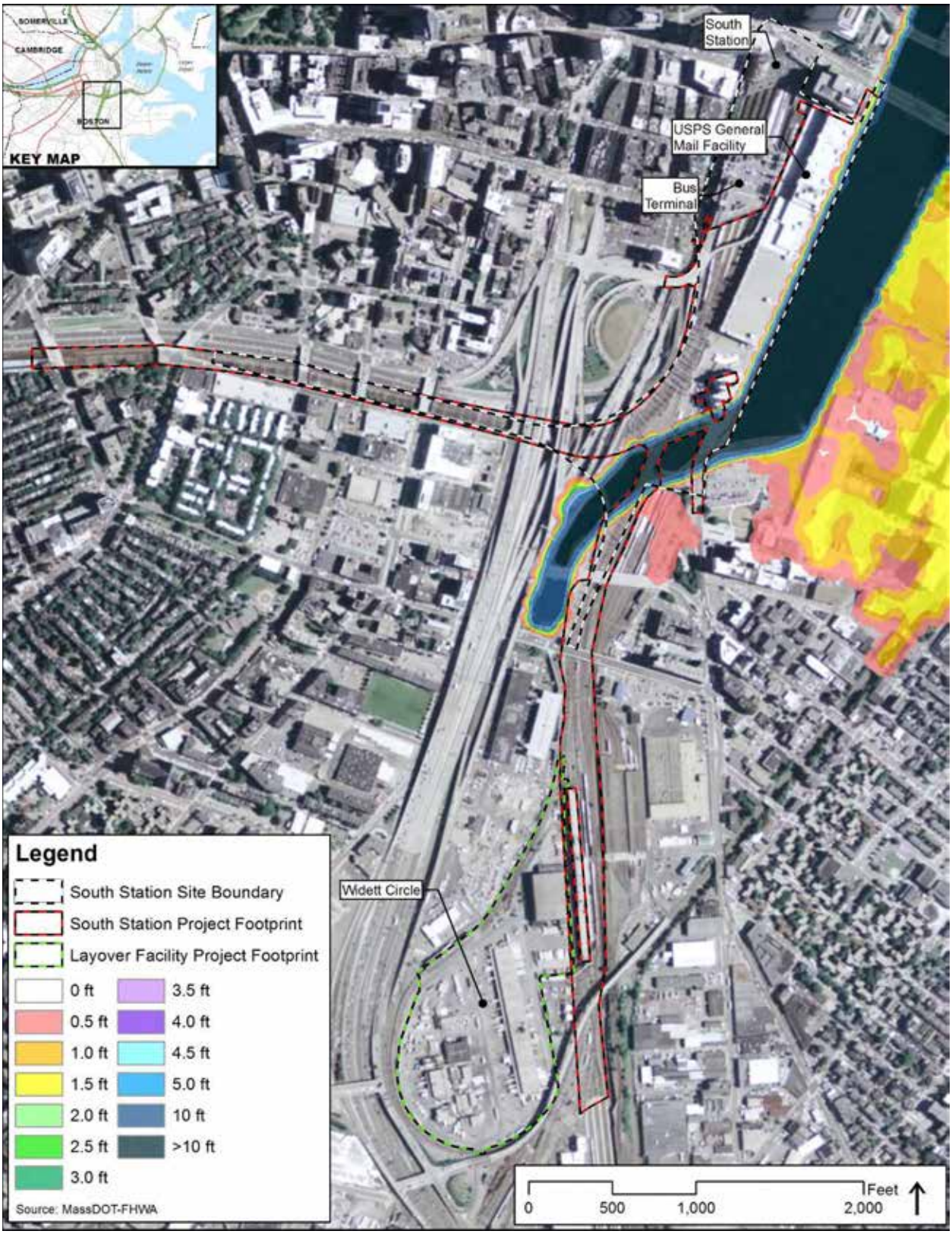

Figure 3-23 — Boston Harbor Flood Risk Model 1% Flood Depths 2030

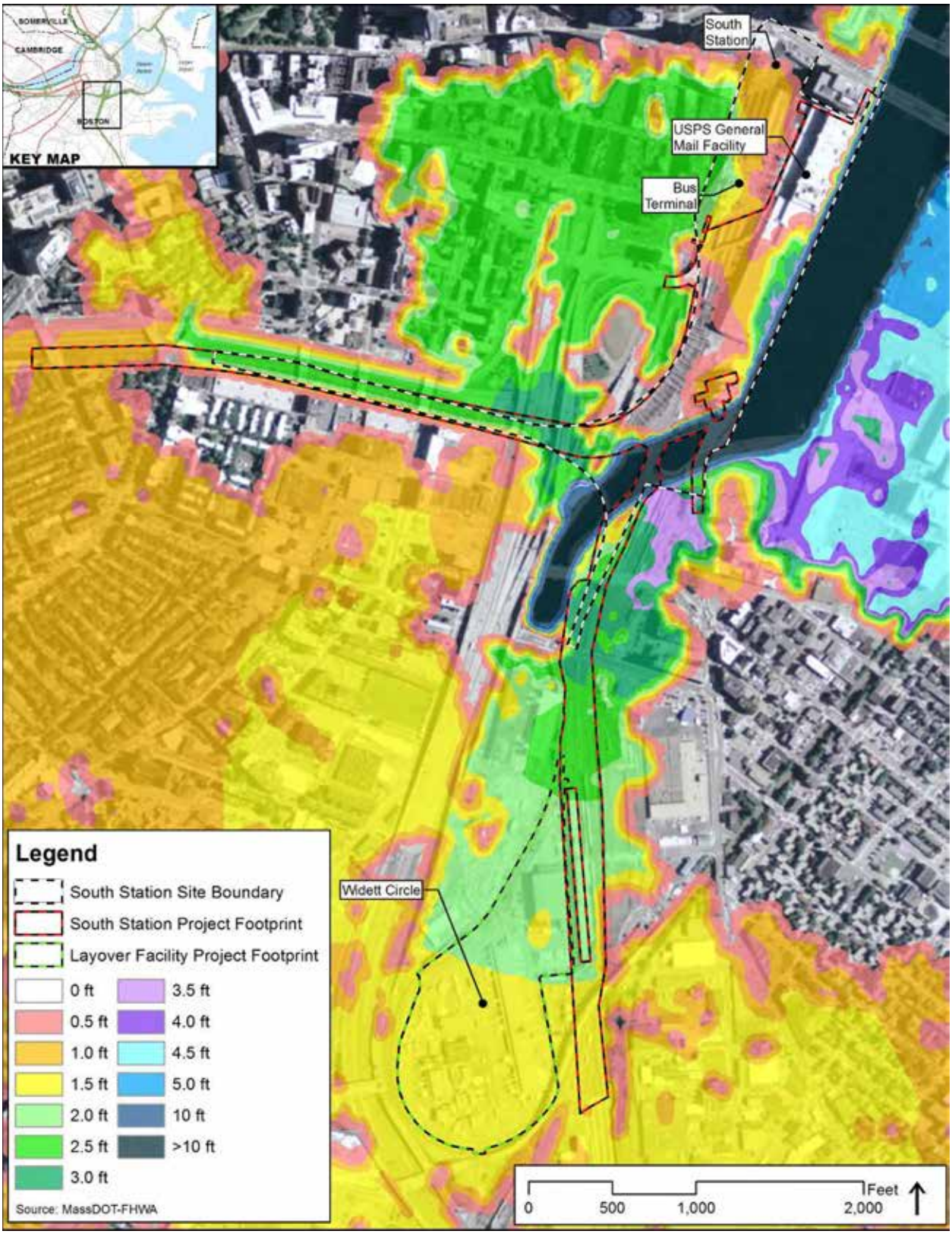

Figure 3-24 —Boston Harbor Flood Risk Model 1% Flood Depths 2070

3.10.2. Selection and Implementation of Adaptation and Resiliency Measures

In an effort to minimize impacts to the project resulting from climate change, including changes to air temperature, flood frequency and extent, and stormwater drainage, MassDOT is committed to implementing adaptation and resiliency measures. To mitigate the impact of temperature increases, MassDOT would consider sustainable design guidelines during the design of public buildings to alleviate extreme heat (DEIR, Section 5.1.3).

Site-specific elements for mitigating for impacts due to rising sea level and hurricanes would be selected and implemented as further analysis of the effects of climate change on the site and surrounding areas is performed. Since the DEIR, a proposal to raise the seawall has been added to the project, largely in response to the potential impacts of sea level rise. CZM estimates up to nearly two feet of sea level rise by the year 2050, which would raise the BFE established by FEMA at this location from 10 feet to 12 feet. To mitigate flooding on the project site, the seawall and the adjacent portion of Dorchester Avenue would be raised from their current elevation of 10.5 feet to 12.0 feet to match the elevation of the existing seawall to the north and south. Raising the seawall and adjacent roadway in this manner would help protect the South Station site in the area along Dorchester Avenue where the USPS facility is currently located from future coastal storm flooding.

MassDOT is currently working with the FHWA to expand the BH-FRM by providing additional information to the analysis described in Section 3.10.1, Vulnerability Assessment Comparison. Mitigation methods that MassDOT would consider to minimize South Station's vulnerability to flooding events include various repair and maintenance procedures of underground systems during design and construction. Specifically, elevating power/heating, ventilation and air conditioning (HVAC) sources and relocating critical systems to higher levels would be considered. Designing infrastructure and critical equipment to accommodate seawater flooding, water-proofing subsurface site elements, and using corrosion protection elements and materials for underground structures are additional solutions. New products and materials that are used to implement these strategies would be selected to have environmentally, economically, and socially preferable life-cycle impacts. As design progresses, MassDOT would continue to look to implement adaptation and resiliency strategies that would be easier to incorporate during planning and construction of the SSX project as a preventative measure to avoid modifying the infrastructure as a reactionary measure in the future.

3.10.3. Timing of Adaptation Measures

As the design progresses, MassDOT would continue to identify strategies that could be incorporated during the construction of the SSX project as a preventative measure as opposed to modifying the infrastructure as a reactionary measure in the future.

3.10.4. Stormwater Management Adaptation and Resiliency Measures

Storm drainage systems and associated infrastructure would be affected by the change in amount, frequency, and timing of precipitation due to climate change. The proposed drainage systems for the project would be sized using the storm event rainfall totals and distributions from the *Northeast Regional Climate Center Extreme Precipitation Analysis* (http://precip.eas.cornell.edu/) which accounts for the most recent rainfall data. According to the documentation "The website will provide a subset of users access to extreme rainfall statistics through the most recent year (i.e., there will be an automatic update of the rainfall statistics on an annual basis). In future years, these updates will provide the necessary information for considering subsequent updates and provide a readily available source of updated statistics. In other words, the already calculated updated rainfall statistics can be adapted as the new standard if desired." Therefore, by using this data for drainage system sizing, the project would be accounting for the recent trend of larger, more extreme rain events. As design progresses, calculations would be cross-checked with the BWSC's 2015 *Wastewater and Storm Drainage System Facilities Plan,*

Final Report,[12] which identifies recommended annual rainfall volumes for use in identifying the frequency, overall magnitude and operation costs of future wet weather discharges, as well as the 10-year, 24-hour design storm to use for drainage and conveyance calculations.

3.10.5. Mitigating the Impact of Sea Level Rise on Combined Sewer Overflows

Sea level rise could affect downstream CSOs and MWRA facilities, which in turn could affect the performance of the South Station wastewater system. The three CSO outlets to Fort Point Channel (CSO 064, CSO 065 and CSO 068) may require additional mitigation measures to minimize seawater entering back into the combined sewer lines. The BWSC's plan to modify CSO and storm drain outfall operations includes:

- Ensuring all CSO outfalls have tide gates to protect facilities and operations from flooding due to a combination of storm surge and sea level rise;
- Use recommended design flood elevations (ranging from 18 to 22 feet Boston City Base) to determine if and when backflow prevention is required on storm drain system outfalls; and
- Periodically reevaluate the frequency and procedures for tide gate and outfall maintenance and replacement to assure proper operations under more frequent submergence due to higher sea levels.

Further coordination with BWSC would be performed as the project progresses. MassDOT would comply with all BWSC requirements related to this plan.

3.11. Air Quality

This section includes a summary of the project's potential impact on air quality, and also provides the following information requested in the Secretary's Certificate:

- Clarification on whether the air quality analysis conducted in the DEIR considered the potential concentration of air pollutants within the platform and track area at South Station subsequent to the construction of Build Alternatives 2 or 3. If this analysis did not evaluate this condition, the FEIR should include supplemental analyses of criteria pollutants, ultrafine particulates (UFPs) and diesel particulate matter (DPM) in the Build Condition (Section 3.11.2).

3.11.1. Impact Summary

Project-related impacts would include emissions generated by locomotives entering and leaving the South Station Rail Terminal and related layover facilities and vehicular traffic. Based on the results of the emissions inventory analysis for the air quality study area, the small increases in pollutant emissions in the vicinity of the South Station site or the layover facility sites due to the project would not lead to exceedances of the Massachusetts or National Ambient Air Quality Standards (MAAQS and NAAQS) and no adverse air quality impacts are expected to occur as a result of the project. Additional impacts include:

- The results of the carbon monoxide (CO) modeling analysis at the selected traffic intersections in the air quality study areas indicate that increases in project-related motor vehicle traffic volumes would not lead to exceedances of the NAAQS or MAAQS for CO, and no adverse air quality impacts are expected to occur as a result of the project. Based on the CO hot spot analysis, no mitigation measures would be required for any of the traffic intersections analyzed for the project.

[12] Boston Water and Sewer Commission. Wastewater and Storm Drainage System Facilities Plan, Final Report. 2015

- The results of the mobile source air toxics (MSAT) analysis indicate that there would be only a slight increase in MSAT emissions due to the project compared to MSAT emissions from the No Build Alternative. These small increases would be unlikely to result in adverse health effects within the South Station study area.
- Based on a qualitative assessment of DPM emissions, with an increase in the use of diesel-powered vehicles, DPM emissions are expected to increase. For each project year, the project would produce more DPM emissions than the No Build Alternative.
- A qualitative assessment of UFP emissions found that they are expected to increase over time. For each project year, the project would produce more UFPs than the No Build Alternative.

Temporary air quality impacts could result from construction activities associated with the project. Construction-related impacts can include fugitive dust emissions, direct emissions from construction equipment, and increased emissions from motor vehicles on local streets due to traffic disruption. These impacts would be mitigated to the greatest extent practicable as described in Section 3.16, Construction Impacts.

3.11.2. Concentration of Air Pollutants

MassDOT selected Alternative 1 as the preferred alternative for the project, wherein the platform and track area would not be fully enclosed. Therefore analysis of the potential concentration of air pollutants within the platform and track area at South Station is not required by the Secretary's Certificate. UFP and DPM analysis are occasionally performed for special projects and research studies using computation fluid dynamics (CFD) modeling. Current regulations do not require analyses of UFP or DPM, and such analysis are not typically performed for environmental permitting purposes.

3.12. Noise and Vibration

This section includes a summary of the project's noise and vibration impacts, and also provides the following information requested in the Secretary's Certificate:

- A discussion of how the preferred station design and South Station platform and track layout will not alter the anticipated noise and vibration characteristics of the site modeled in the DEIR (Section 3.12.2);
- Identification of how station design elements would provide noise mitigation in interior spaces (Section 3.12.3);
- A feasibility assessment of potential mitigation measures, a phasing plan for their implementation, and identification of responsible parties for their construction and maintenance (Section 3.12.3);
- A discussion on whether MassDOT would implement noise and operational BMPs equal to or more stringent than those currently utilized at other layover facilities along the commuter rail. MassDOT should confirm that a forum for citizen complaint would be implemented as a BMP in the operational plan for any proposed layover facilities and at South Station. The FEIR should identify these proposed BMPs and note any contractual obligations associated with the operator of the MBTA's commuter rail (Section 3.12.4); and
- A commitment to monitoring noise and vibration levels after service starts (with the proposed mitigation in place) to evaluate whether actual noise and vibration levels correspond with the modeled values (Section 3.12.5).

3.12.1. Impact Summary

For each identified noise-sensitive receptor location, project noise levels for the year 2035 were compared with the Federal Transit Administration (FTA) noise criteria[13] to determine impact. Noise impact assessments are based on the selected receptor's sensitivity to noise. For example, the day-night average sound level (or Ldn) is the noise metric used to assess project impacts at residential receptors, while the hourly noise level (or Leq) is used to assess impacts at non-residential and institutional receptors. The Ldn level represents the average noise level measured over a 24-hour period with a 10-dBA (A-weighted decibel) penalty added to the nighttime hours (10:00 p.m. to 7:00 a.m.) to account for people's increased sensitivity to noise while they are trying to sleep. The Leq level represents a level of constant noise that has the same acoustic energy as the fluctuating noise level measured over a given time period such as an hour. Section 3.12.3 identifies measures that would be implemented to mitigate anticipated impacts.

South Station

In the absence of mitigation, noise impacts from the project would be expected to occur at noise sensitive receptor locations across Fort Point Channel due to the removal of the USPS facility along Dorchester Avenue, which currently acts as an effective noise barrier. With the removal of the USPS facility, there would be a direct sound propagation path to sensitive noise receptors across Fort Point Channel at Necco Street. As a result, the Ldn noise level across Fort Point Channel would exceed the FTA moderate impact criteria (change in noise is noticeable, but may not be sufficient to cause a strong, adverse community reaction.). In addition, the Leq noise level at 245 Summer Street would exceed the FTA moderate impact criteria. These noise impacts would be fully mitigated by the construction of a noise wall as described in Section 3.12.3, Potential Mitigation Measures.

Because of the slow speed of the trains entering and leaving South Station, train vibration levels are not expected to exceed the FTA criterion for human annoyance (72 VdB), or the criterion for buildings where low vibration is essential for typical indoor equipment operations such as computers (65 VdB). The vibration levels would only be perceptible along the platforms when standing next to the locomotives.

Layover Facilities

There would be no noise impact from the train operations at the Widett Circle layover facility site; the nearest noise sensitive receptors located along Albany Street are approximately 1,300 feet from the acoustic center of the site.

At the Readville – Yard 2 layover facility site, the midday peak activity hour Leq noise level would exceed the FTA moderate impact criterion at the nearby single-family residential receptors located along Wolcott Street and Wingate Road, and the apartment buildings along Riley Road and Sierra Road. This impact would be fully mitigated by the expansion of the existing noise wall as described in Section 3.12.3.

Because of the slow speed of the trains entering and leaving the layover facilities, train vibration levels are not expected to exceed the FTA criterion of 72 VdB (vibration level in decibels referenced to 1 micro inch per second) for human annoyance. Vibration levels from the track switches and crossovers would exceed the FTA annoyance criterion at residential receptors located within 130 feet of a switch. At Widett Circle and Readville – Yard 2, residential receptors are not located within 130 feet of any switches or crossovers.

[13] Federal Transit Administration, Office of Planning and Environment. *Transit Noise and Vibration Impact Assessment (FTA-VA-90-1003-06)*. May 2006. http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf

Construction Noise and Vibration

The results of the detailed construction noise assessment conducted for the DEIR indicate that the highest construction noise levels would occur during the demolition of the USPS facility and the construction of the headhouse. The construction of the headhouse could require the use of an impact pile driver that generates a maximum noise level of 101 dBA (a-weighted decibels) at a distance of 50 feet. Because of the close proximity of the office building at 245 Summer Street to the construction activity, the construction noise levels at this location are expected to exceed the City of Boston construction noise limits during the demolition of the USPS facility, the construction of the headhouse, and the construction of the tracks and platforms. The construction noise levels at residential locations along Atlantic Avenue and the Fort Point Historic District are expected to exceed the City of Boston construction noise limit of 75 dBA if pile driving is required. Without pile driving, the construction noise levels at these residential locations would not exceed 75 dBA. In addition, if pile driving is required, the construction noise level would exceed the City of Boston construction noise limit of 80 dBA for commercial receptors such as the main South Station headhouse.

The construction noise levels for the Widett Circle layover facility would be below the City of Boston L10 (noise level exceeded 10% of the time) construction noise limit of 75 dBA because of the distance (1,200 feet) of the nearest residential receptors along Albany Street from the Widett Circle construction activity. However, the construction noise levels at the Readville – Yard 2 layover facility would exceed the construction noise limit at the single-family residences along Wolcott Street and Wingate Road, and the apartment buildings on Riley Road and Sierra Road.

In general, the vibration levels generated by the typical construction equipment proposed for this project would not result in structural damage to nearby buildings, but could exceed the FTA human annoyance criterion of 72 VdB. The vibration levels from the typical construction equipment used on this project would range from 80 VdB for a jackhammer at a distance of 25 feet, to 87 VdB for a mounted impact hammer at a distance of 25 feet. Although these vibration levels are below the building damage threshold of 100 VdB, they would exceed the FTA criterion of 65 VdB for buildings with sensitive equipment such as the building at 245 Summer Street.

Also, an impact pile driver, such as the one proposed for the headhouse construction, could generate vibration levels in the range of 104 to 110 VdB at a distance of 25 feet depending on the size and foot-power rating of the impact hammer. A pile driver with a vibration level of 110 VdB at a distance of 25 feet would result in a vibration level of 100 VdB (the threshold for building damage) at a distance of 65 feet. In addition, these vibration levels could impact the sensitive computer equipment in the basement of 245 Summer Street.

Based on the list of proposed construction equipment to be used in the construction of the Widett Circle and Readville – Yard 2 layover facilities, vibration levels are expected to be below the building damage criterion of 100 VdB and the FTA human annoyance criterion of 72 VdB. At the Widett Circle layover facility, vibration levels during construction are expected to be below 50 VdB at the nearest sensitive receptors along Albany Street, and below 60 VdB at the nearest sensitive receptors at the Readville – Yard 2 layover facility.

3.12.2. Modeled Noise and Vibration Characteristics

The selected Build Alternative's station design and South Station platform and track layout will not alter the anticipated noise and vibration characteristics of the site modeled in the DEIR. The criteria established by the FTA were used to evaluate impacts at noise-sensitive receptor locations adjacent to or near South Station and the layover facility sites. The FTA guidelines assess noise impacts based on the selected land-use's sensitivity to noise. Train noise reflected from nearby building structures such as the headhouse and

the overhead bus terminal facility at South Station are not factors that can be input into the FTA noise model, therefore changes to the station design since the DEIR do not impact the results of the model. The number of train operations and track assignments has not changed for the selected Build Alternative between the DEIR and the FEIR. Consequently, the results of the noise modeling analysis remain unchanged for the preferred alternative.

3.12.3. Potential Mitigation Measures

South Station

Noise mitigation for the interior headhouse space and waiting area at South Station would be provided by the doors that separate the headhouse from the tracks and platforms. No additional mitigation would be necessary.

At South Station, a noise barrier of 1,450 feet in length is recommended to provide noise mitigation for the entire Fort Point Historic District including Dorchester Avenue, which would now be open to pedestrians as part of the Harborwalk. This is the approximate length of the existing USPS facility that now provides noise mitigation from the train operations at South Station. This noise barrier (18 feet high and 1,450 feet long) would provide approximately 10-12 dBA (a-weighted decibels) noise reduction to the Fort Point Historic District and the Dorchester Avenue Harborwalk. To be effective, the proposed noise barrier must block the direct line of sight (sound propagation path) between the noise source (idling locomotive) and the receptor. The noise barrier is most effective when it is either near the noise source or near the receptor. For practical purposes, the proposed South Station noise barrier would be located on South Station property along the easternmost track on the Dorchester Avenue side of the station (Figure 3-25). The structural design of a noise barrier would be in accordance with the current edition of the AASHTO's *Guide Specifications for Structural Design of Sound Barriers,*[14] and with MassDOT's *Standardized Foundations for Sound Barrier Walls*.[15]

Construction of the noise barrier would likely occur following the removal of the USPS facility and before the construction of Dorchester Avenue and the Harborwalk. MassDOT would be responsible for the construction and maintenance.

Readville – Yard 2

At the Readville – Yard 2 layover facility, the existing berm/noise barrier is approximately 400 feet long and 18 feet high relative to the elevation of the tracks. It would be reconfigured to provide additional noise mitigation to the single-family homes along Wolcott Street and Wingate Road and the apartment buildings on Riley Road and Sierra Road. Work would include removal of approximately 200 feet of the existing barrier and addition of up to approximately 600 feet of modified/new barrier, for a proposed barrier measuring approximately 18 feet high by 800 feet long. Figure 3-26 shows the location of the existing and proposed berm/noise barrier. In addition, electric power stations, also known as shore power, would be constructed so that the locomotives can be plugged in to reduce the amount of engine idling time at the layover facility.

[14] American Association of State Highway and Transportation Officials (AASHTO). *Guide Specifications for Structural Design of Sound Barriers*. 1989, amended in 1992 and 2002.

[15] Massachusetts Department of Transportation. *Standardized Foundations for Sound Barrier Walls*. September 2004.

3.12.4. Noise and Vibration Operational Best Management Practices

MassDOT adheres to federal regulations for noise mitigation at all of its facilities. The MBTA currently provides a customer support forum for inquiries, comments, and concerns via its website (http://www.mbta.com/customer_support/feedback/) and by phone (617-222-3200 or 800-392-6100; TTY 617-222-5146). All inquiries are reviewed carefully by the Customer Support Group.

3.12.5. Noise and Vibration Monitoring

In order to provide a high level of protection from additional noise impacts, the project has designed a noise barrier that would provide a far greater noise reduction than required. Therefore, monitoring of post-construction noise levels is not necessary as part of this project. Due to the slow speed of the trains entering and leaving South Station, the vibration levels from the trains are not expected to exceed the FTA criterion for human annoyance.

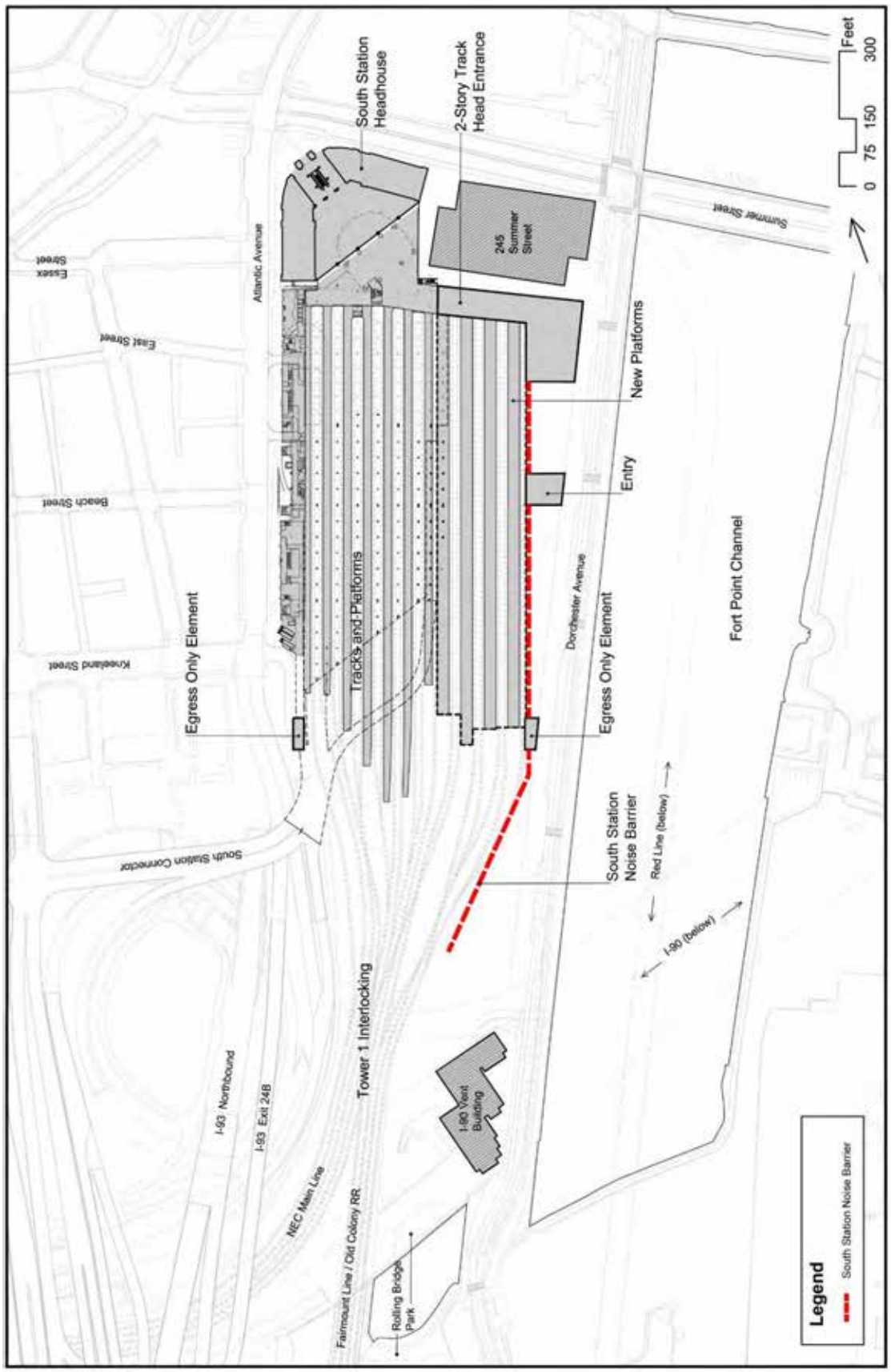

Figure 3-25 —South Station Proposed Noise Barrier

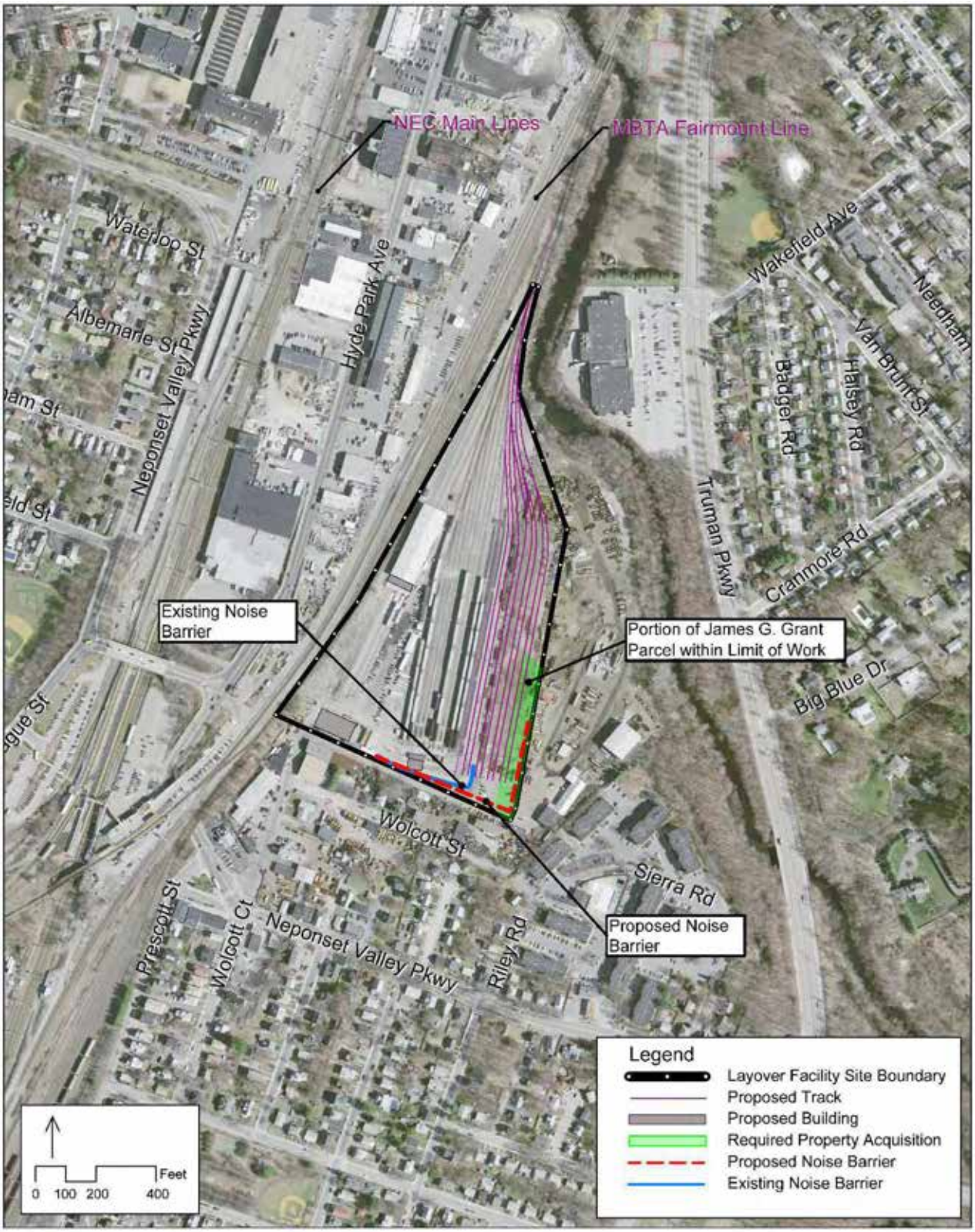

Figure 3-26 — Readville – Yard 2 Expansion of Existing Noise Barrier

3.13. Greenhouse Gas Emissions

This section includes a summary of the impacts of the project on greenhouse gas emissions, and also provides the following information requested in the Secretary's Certificate:

- A clear and complete listing of modeling inputs for items such as equipment, walls, ceilings, windows, lighting, and heating, ventilation and air conditioning (HVAC) units, etc. that were modeled in the No Build and Build Alternative to allow for an easier comparison with Building Code requirements (Section 3.13.2);
- Additional analysis of technical and economic feasibility of the following potential renewable energy sources: Veolia steam network connections, including the use of steam to power absorption chillers; solar photovoltaic (PV) or solar hot water (SHW) installations; and on-site combined heat and power (CHP), including CHP-serving absorption chillers (Sections 3.13.3-6);
- A commitment to construct buildings to be "solar ready" to facilitate future installation of PV systems. If PV is not financially feasible, MassDOT should commit to revisit the PV financial analysis on a regular timetable and to implement PV when the financial outcomes meet specified objectives (Section 3.13.4);
- A revised mobile source emissions analysis that accounts for indirect electrical use associated with the proposed plug-in facilities at South Station and the layover sites (Sections 3.13.7-8);
- Clarification on which standards MassDOT must adhere to in the final design process and those which are merely informational. The FEIR should clarify how the project intends to meet these standards given, in some cases, the outdated benchmarks (e.g., ASHRAE 90.1-2004 for LEED Plus) compared to current Massachusetts Stretch Code standards (Section 3.13.9); and
- Clarification on which sustainable infrastructure rating system MassDOT intends to adopt to ensure the project design meets targeted sustainability goals (Section 3.13.9).

3.13.1. Impact Summary

This project is subject to review in accordance with the *MEPA Greenhouse Gas Emissions Policy and Protocol* (GHG Policy, May 2010 version). The *GHG Policy* requires that for certain projects undergoing review by the MEPA Office, GHG emissions be quantified and measures to avoid, minimize, or mitigate such emissions be identified. In addition to quantifying project-related GHG emissions, the GHG Policy requires proponents to quantify the impact of proposed mitigation in terms of energy savings and GHG emissions.

The DEIR Section 4.11 and DEIR Appendix 12 provided the GHG analysis for the project. Consistent with the DEIR:

- The analysis focuses on emissions of CO_2. This is because CO_2 is the predominant contributor to global warming, CO_2 is by far the predominant GHG emitted from the types of sources related to the SSX project, and CO_2 emissions can be calculated for these source types with readily-available data;
- GHG emissions can be categorized into two groups: (1) emissions related to activities that are stationary on the SSX project sites; and (2) emissions related to transportation. Activities on the site can be further broken down into direct sources and indirect sources. Direct sources include GHG emissions from fuel combustion. Indirect sources include GHG emissions associated with water use, electricity, and other forms of energy that are imported from off-site power plants via the regional electrical grid or local steam distribution system for use on-site;

- The analysis calculates GHG emissions for a baseline case from which progress in energy use and GHG emissions reductions for the SSX project is measured (generally compliance with building codes and "business as usual" operations) and a proposed case, including measures incorporated into the building design that exceed those measures required for compliance (Figures 3-27 and 3-28); and
- Stationary source CO_2 emissions are predominantly based on natural gas and electricity use. The emission factors used for the calculation are 11.69 pounds of CO_2 per therm of natural gas used (from the U.S. Energy Information Administration),[16] and 719 pounds of CO_2 per megawatt hour electricity used (annual average from the January 2014 version of the ISO New England Electric Generator Air Emissions Report). Although the current version of the ISO air emissions report shows a slightly higher CO_2 emission rate (1%), the factors used in the DEIR are retained to allow direct comparison to the results in the DEIR.

As a result of compliance with the Massachusetts Stretch Energy Code, project-related stationary source GHG emissions at South Station would be reduced by approximately 8% as indicated in Table 3-10. As is typical for smaller buildings, the layover facility sites would comply with building energy code and Stretch Code requirements through prescriptive energy efficiency measures.

MassDOT also analyzed transportation-related, or mobile source, GHG impacts of the SSX project. The results show an approximately 5% net reduction in CO_2 emissions from locomotives in the immediate vicinity of South Station, associated with decreased congestion and idling time on the tracks, as depicted in Table 3-11. The project-related emissions totals in Table 3-11 do not account for the use of electric plug-in facilities, which result in indirect CO_2 emissions from electricity use. Plug-ins allow MassDOT to limit locomotive idling during layovers, by providing shore power. This is discussed further in Section 3.13.7, Effect of Locomotive Plug-Ins. Additionally, the totals represent a conservative approach and do not account for the anticipated GHG reduction associated with traffic intersection improvements (and decreased motor vehicle idling time).

Table 3-10 — Calculated Total Project-Related Stationary Source GHG Emissions

	Gas Use (MMBtu[a]/year)	Electric Use (MMBtu/year)	Gas CO_2 Emissions (tons/year)	Electric CO_2 Emissions (tons/year)	Total CO_2 Emissions (tons/year)
Baseline Case (MA Building Code, 8th Edition)	4,300	20,270	251	2,136	2,387
Mitigated Case (Proposed)	2,712	19,299	159	2,033	2,192
Reduction	1,588	971	92	103	195
% Reduction	**37%**	**5%**	**37%**	**5%**	**8%**

[a] MMBTU= one million British Thermal Units

[16] U.S. Energy Information Administration (EIA). http://www.eia.gov/oiaf/1605/coefficients.html#tbl3, accessed August 5, 2014.

Table 3-11 — Project-Related CO_2 Emissions by Alternative

Transportation Sources	2012 Existing (tpy)	2025 No Build (tpy)	2025 Build (tpy)	2035 No Build (tpy)	2035 Build (tpy)	2035 Net Difference (tpy)	% Difference
Motor Vehicles near South Station	11,767	12,321	12,491	12,771	13,010	239	2%
Intercity buses near South Station	581	732	767	785	819	34	4%
Locomotives near South Station	15,233	14,603	13,870	14,603	13,870	-733	-5%
Locomotives to/from Widett Circle	0	0	5,753	0	5,753	5,753	N/A
Locomotives to/from Readville – Yard 2	3,135	3,135	5,643	3,135	5,643	2,508	80%
Total	**30,716**	**30,791**	**38,524**	**31,294**	**39,095**	**7,801**	**25%**

tpy = tons per year

The total potential CO_2 emissions that would result from the project are shown in Table 3-11. While not directly comparable (because the analysis methodologies are different), the regional analysis of transportation-related CO_2 emissions shows a decrease in region-wide[17] CO_2 emissions associated with the transportation improvements at South Station of approximately 46,000 tons/year (shown in Section 11.2 of DEIR Appendix 12).

Table 3-12 — 2035 Potential GHG Emissions Summary

Emissions Source	Annual CO_2 Emissions (tpy)
Stationary Source direct emissions	159
Stationary Source indirect emissions	2,033
Transportation mobile source emissions	7,801
Indirect emissions from electricity for plug-ins	2,717
Total	**12,710**

tpy = tons per year

3.13.2. Building Energy Modeling Details

While the station design has progressed, the general sizing and configuration of the terminal expansion are not substantially changed, and the results of the building energy modeling presented in the DEIR are still valid. A summary of program changes since the DEIR is in Table 3-13 below:

Table 3-13 — Comparison of Program Space: DEIR and FEIR

Program Element	DEIR		FEIR	
	Conditioned Space	Total Area	Conditioned Space	Total Area
Platform Level	160,000	243,000	43,200	223,200
Elevated Concourse Level	45,000	160,000	69,000	69,000
Back of House (20%)	--	--	58,440	58,440
Contingency (10%)	--	--	35,064	35,064
Totals	**205,000**	**403,000**	**205,704**	**385,704**

[17] The Boston Region MPO region encompasses 101 cities and towns, stretching from Boston to Ipswich in the north, Duxbury in the south, and to approximately Interstate 495 in the west.

The stationary source estimates of GHG emissions were generated by building energy modeling using eQUEST v3.64. Consistent with the DEIR, the GHG Baseline Case and the GHG Mitigated (Proposed) Case have the following design assumptions:

For the GHG Baseline Case, an overhead variable air volume (VAV) ventilation system would serve the expansion. Cooling would be provided by 0.4 kilowatt (kW)/ton integrated part-load volume (IPLV) minimum efficient centrifugal chillers tied to a constant primary, variable secondary hydronic loop. Heating would be provided by 80%-efficient natural draft, non-condensing boilers, tied to a common variable speed building hot water loop. Ventilation has been estimated at 14.3 cubic feet per minute (cfm)/person based on ASHRAE 62.1.[18] Variable speed fans would run continuously and fan power is estimated at 1.31 watts per cfm of supply air. In all zones 50% efficient enthalpy energy recovery units would be required due to high occupant densities. Interior lighting would be limited to 0.77 watts per square foot with occupancy sensors and code minimum daylighting along the perimeter and top floor skylight areas.

For the GHG Mitigated Case, an overhead VAV system would continue to serve the expansion. Cooling would be provided by 0.34 kW/ton IPLV centrifugal magnetic bearing chillers (improved from baseline), tied to a constant primary, variable secondary hydronic loop. Heating would be provided by 96% efficient condensing boilers (improved from baseline), tied to a common variable speed building hot water loop. Ventilation has been estimated at 14.3 cfm/person based on ASHRAE 62.1. Variable speed fans would run continuously and fan power is estimated at 1.31 Watts per cfm of supply air. In all zones 75% efficient enthalpy energy recovery units (improved from baseline) would be required due to high occupant densities. Interior lighting would be limited to 0.62 Watts per square foot (improved from baseline) with occupancy sensors and optimized perimeter daylighting that exceeds code requirements along the perimeter and top floor skylight areas.

Key model inputs that were used for the terminal expansion are in Table 3-14 below. This includes a listing of modeling for equipment, walls, ceilings, windows, lighting, HVAC units, and other factors that were modeled in the Baseline Case and Build with Mitigation (Proposed) Case. Specific inputs such as R-values and U-values (for insulation), chiller and boiler efficiencies, lighting power density, etc. are included below as requested by the Secretary's Certificate on the DEIR:

Table 3-14 — Key Building Energy Model Inputs for South Station

Model Input Parameter	SSX Baseline[19]	SSX Build With Mitigation (Proposed)[20]
Building Envelope		
Roofs	R20 ci above deck, U-0.048	Identical to baseline
Walls-Above Grade	R13+R7.5 ci, U-0.064	Identical to baseline
Slab-On-Grade Floors	F=0.73	Identical to baseline
Conditioned Area (SF)	205,000	Identical to baseline
Building Fenestration		
Vertical Fenestration Area (% of Wall area)	20%	Identical to baseline
Vertical Glazing Description	Curtainwall	Identical to baseline
Vertical Glazing U-factor	U-0.45	U-0.38

[18] ASHRAE (American Society of Heating, Refrigerating and Air Conditioning Engineers) Standards 62.1 and 62.2 are the recognized standards for ventilation system design and acceptable indoor air quality.
[19] The Baseline case is the project as if it were designed to meet, but not exceed, the 8th edition of the Massachusetts Building Code (Code), with amendments, issued by the Board of Building Regulations and Standards (BBRS). See DEIR Appendix 12 Section 3.1, for details.
[20] The Build With Mitigation (Proposed) Case is the project as proposed, with mitigation measures incorporated into the building design that exceed those measures required for compliance with the 8th edition of the Code, including measures to meet Stretch Code. See DEIR Appendix 12 Section 3.2, for details.

Model Input Parameter	SSX Baseline[19]	SSX Build With Mitigation (Proposed)[20]
Vertical Glazing SHGC	SHGC-0.4	Identical to baseline
Fenestration Visual Light Transmittance	VLT-0.6	Identical to baseline
HVAC – Air Side		
Primary HVAC Type	VAV	Identical to baseline
Fan System Operation	On 24/7	Identical to baseline
Outdoor Air Design Min Ventilation	Transportation - 14.3 cfm/per	Identical to baseline
Economizer High-Limit Shutoff	70F drybulb	Delta enthalpy control
Total System Fan Power (Conditioned)	292 kW	288 kW
6.5.3.1.1B Pressure Drop Adjustments	0.5" Ducted return 0.9" MERV 14 0.1" ERV	Identical to baseline
Exhaust Air Energy Recovery	50% total effectiveness both systems	75% total effectiveness on both systems
Demand Control Ventilation	Not required	Identical to baseline
Supply Air Temperature Reset Parameters	Increased 5F based on load	Identical to baseline
HVAC – Water Side		
Number of Chillers	2	Identical to baseline
Chiller Capacity (Per Chiller)	958T	945T
Chiller Efficiency	0.59 kW/Ton FL 0.4 kW/Ton IPLV	0.59 kW/Ton FL 0.34 kW/Ton IPLV
Chilled Water Loop Supply Temperature	44F	Identical to baseline
Chilled Water (CHW) Loop Delta-T	12F	Identical to baseline
CHW Loop Temp Reset Parameters	44F @ 80F OA 54F @ 60F OA Ramped linearly in between	Identical to baseline
CHW Loop Configuration	Constant primary, variable secondary	Identical to baseline
Primary CHW Pump Power	9 kW	8.8 kW
Secondary CHW Pump Power	32 kW	31.6
Number of Cooling Towers / Fluid Coolers	One per chiller	Identical to baseline
Cooling Tower Fan Power	35.3 kW	34.9 kW
Cooling Tower Fan Control	Two Speed	Identical to baseline
Condenser Water Leaving Temperature	70F with wet bulb reset to 85F	Identical to baseline
Condenser Water (CW) Loop Delta-T	10F	Identical to baseline
Number of CW Pumps	2	Identical to baseline
CW Pump Power	49.6 kW	49 kW
CW Pump Speed Control	Constant	Identical to baseline
Number of Boilers	2	Identical to baseline
Boiler Part-Load Controls	Staged to meet load	Identical to baseline
Boiler Capacity (Per Boiler)	9 MMBTUh	8.8 MMBTUh
Boiler Efficiency	0.8	96% Condensing Type
Boiler Water Loop Supply Temperature	180F	140F

Model Input Parameter	SSX Baseline[19]	SSX Build With Mitigation (Proposed)[20]
Hot Water or Steam (HHW) Loop Delta-T	50F	30F
HHW Loop Temp Reset Parameters	180F @ 20F OA 150F @ 50F OA Ramped linearly in between.	140F @ 50F OA 110F @ 0F OA Ramped linearly in between.
HHW Loop Configuration	Variable Primary	Identical to baseline
Primary HHW Pump Power	6.7 kW	11.9 kW
Service Hot Water		
SHW Equipment Type	Gas Storage	Identical to baseline
Equipment Efficiency	0.8	Identical to baseline
Temperature Controls	110F	Identical to baseline
Peak Flow	45.8 GPM	Identical to baseline
Lighting		
Automatic Lighting Shutoff Method	Scheduled	Identical to baseline
Gross Lighted Floor Area	205,000	Identical to baseline
Interior Lighting Power Calc Method	Building area method	Identical to baseline
Interior Lighting Power Density (Average)	Transportation 0.77 W/SF	20% better than code: Transportation 0.62 W/SF
Daylight Dimming Controls	Applied to primary side-lighted areas according to ASHRAE Code Section 9.4.1.4 and to top-lighted areas according to ASHRAE Code Section 9.4.1.5	Identical to baseline
Automatic Exterior Lighting Control	Photocell Controlled	Identical to baseline
Total Exterior Lighting Power	79.2 kW	20% better than code: 64 kW
Miscellaneous		
Escalators and Elevators	60 elevators & escalators, nominally 20HP each: 895 kW peak capacity, adjusted for diversity, 2200 full load hours	Identical to baseline
Process loads	1.24 W/SF includes food kiosk load estimate	Identical to baseline

3.13.3. Feasibility of Veolia Steam Use

Additional analysis of the feasibility of the use and GHG benefit of Veolia steam was conducted for this FEIR. Veolia steam in the SSX project area is provided by a mix of CHP sources (from Kendall Generating Station (KGS) in Cambridge) and traditional boilers (primarily from Kneeland Street Station in Boston). A CHP has significant efficiency and environmental advantages, as described by the Massachusetts Department of Environmental Protection (MassDEP)[21]:

> *"In a combined heat and power (CHP) system, the engine or combustion turbine is connected to an electrical generator for electrical power production. The hot exhaust gasses from the engine or combustion turbine are directed through a heat recovery system, such as a boiler, to recover thermal energy for use in heating, cooling, or other uses. This approach eliminates the need for a second combustion unit and therefore eliminates the emissions such a combustion unit would*

[21] Proposed Amendments to 310 CMR 7.00, March 2008.

produce. CHP systems make more efficient use of fuel, such as natural gas or fuel oil, than two, separate stand alone, combustion units, one for electricity and one for thermal energy such as steam thus reducing the net emissions of greenhouse gas and other air contaminants."

Veolia's "Green Steam" project includes a recently completed 7,000-foot steam pipeline extension that allows the company to export more CHP steam from its newly-acquired Kendall Station to Boston customers.[22]

Veolia estimates that the energy supplied would be a mix of 70% cogenerated steam and 30% conventional for the heating portion (space heat/HW), and 90/10 for the cooling load.[23] Veolia does not offer service that is 100% cogenerated steam; the use of traditional boilers is needed for reliability.

Available guidance from MEPA and the Department of Energy Resources (DOER),[24] includes inputs and assumptions regarding operation of the Cambridge district steam (DS) system that DOER obtained from its operator, Veolia. A review of feasibility followed available guidance, adjusted to reflect project-specific information provided by Veolia.

The analysis in Appendix B, *Greenhouse Gas Analysis Documentation,* reviews an alternative where the project would have 100% of its heating needs (building heat and domestic hot water) supplied by Veolia district steam, and 100% of its building cooling needs supplied by Veolia district steam (through the use of absorption chillers instead of electric chillers). The analysis shows an approximately 20% improvement in stationary source GHG emissions attributable to the project based on the use of Veolia steam.

The assumptions and methodologies are generally as laid out in the DOER guidance, which was developed with input from Veolia. Significantly, from that guidance, the analysis assumes:

- Electricity provided by KGS reaches customers with negligible losses from transmission or other inefficiencies.
- All KGS DS is generated by CHP at the efficiencies provided in the DOER guidance (note that the district steam system has boilers that do not operate based on this assumption).
- Greater than 99% of the fuel combusted to generate CHP steam and electricity at KGS is natural gas (note that the district steam system has a combustion turbine that can fire distillate oil, and boilers that can fire distillate and residual oil; there is 0% distillate or residual oil firing based on this assumption).
- The average nominal enthalpy[25] loss, generally described as the heat transferred during a constant pressure process, for the Dalkia Cambridge steam distribution system is 12%.

The implementation of district steam would depend on an energy cost analysis to be completed during the design phase. MassDOT would continue to work with Veolia on terms for possible connection to the district steam system; the final decision would be based on economic, reliability, complexity, and environmental factors.

3.13.4. Feasibility of Solar Photovoltaic Installation

As stated in the DEIR, it is possible to use project roof space for solar PV panels. The preliminary feasibility analysis presented in the DEIR concluded that the terminal expansion would provide

[22] Cogenerated "Green Steam" reduces carbon footprint in Boston and Cambridge. http://www.veolianorthamerica.com/en/boston-cambridge-mass, accessed December 16, 2015.

[23] Steve Almeida, Veolia. South Station Expansion Project. Personal Communication, November 13, 2015.

[24] John J. Ballam, Massachusetts Office of Energy and Environmental Affairs. Guidance for the Application of the MEPA GHG Policy and Protocol to the use of the Dalkia Cambridge CHP District Steam as a Fuel Source. Draft March 11, 2014.

[25] When a substance changes at constant pressure, enthalpy tells how much heat and work were added to (or removed from) the substance.

70,000 square feet of roof space suitable for solar PV panels. A shadow model was also provided as part of the technical report and assumed that 50% of the total roof surface could be available for solar panel placement which brings the usable roof area to 35,000 square feet.

An array of 35,000 sf was estimated to have an output rating of approximately 420 kW of peak direct current (DC). The DEIR describes the use of a photovoltaic model, PV Watts, to determine the total MWh of output from the solar PV setup. This model predicts an annual output of approximately 462 MWh. Actual electricity generated could be lower because the model inputs assume an optimal panel tilt, but the panel tilt may need to be reduced to avoid wind shear.

Displacing energy from the distribution grid would result in a potential GHG savings. The energy generated from the solar PV does not contribute to GHG production and as such would reduce the project's GHG emissions by a proportional amount to the GHG produced to generate the displaced grid energy. Assuming all of the solar PV electricity displaces use of electricity from the distribution grid, the potential annual GHG savings would be 166 tons of CO_2.

Two key implementation challenges for solar PV include future shadowing and the ability to make electrical interconnections. Expected shadowing based on current nearby buildings is included in the analysis. However, future development in the area could easily add shadowing that would render the use of solar PV nonviable. Based on initial contact with the local electricity supplier (Eversource, formerly NSTAR[26,27]), the connection to the electrical grid would likely be through spot network vaults rather than through the radial distribution system. Spot network vaults offer more reliable electricity supply, but are not well suited to receive electricity from distributed generation sources. If the SSX project were served by spot network vaults, any interconnected generation source would be limited to $1/15^{th}$ of the minimum facility load to prevent excess power from flowing into the network and tripping the network protectors in the vault. The connection would also need to use inverter-based equipment. Scaled from the monthly eQUEST modeling results in Figure 3-27, the minimum hourly facility load would be less than 600 kW, which would mean that any on-site generation would be limited to less than 40 kW (approximately one-tenth the size of the system described above).

No specific permitting issues have been identified.

3.13.5. Feasibility of Solar Hot Water Installation

Another option for renewable energy usage is the use of solar hot water. The DEIR discusses how solar hot water may be used as a supplement to typical gas-fired domestic hot water heating systems, sometimes providing hot water directly and other times preheating water that is then brought to normal temperature by a gas-fired boiler. The space required for solar hot water would be the same as the space described above for solar PV; combined solar PV and hot water systems are feasible. To allow solar hot water generation (which occurs during daylight hours) to match demand (which occurs at all hours), solar hot water systems typically include storage tanks.

[26] James Ruberti, NStar, "*Electrical Grid*," Personal Communication, July 25, 2014.
[27] Joseph Feraci, NStar, "*Electrical Grid*," Email/personal communication, July 25, 2014.

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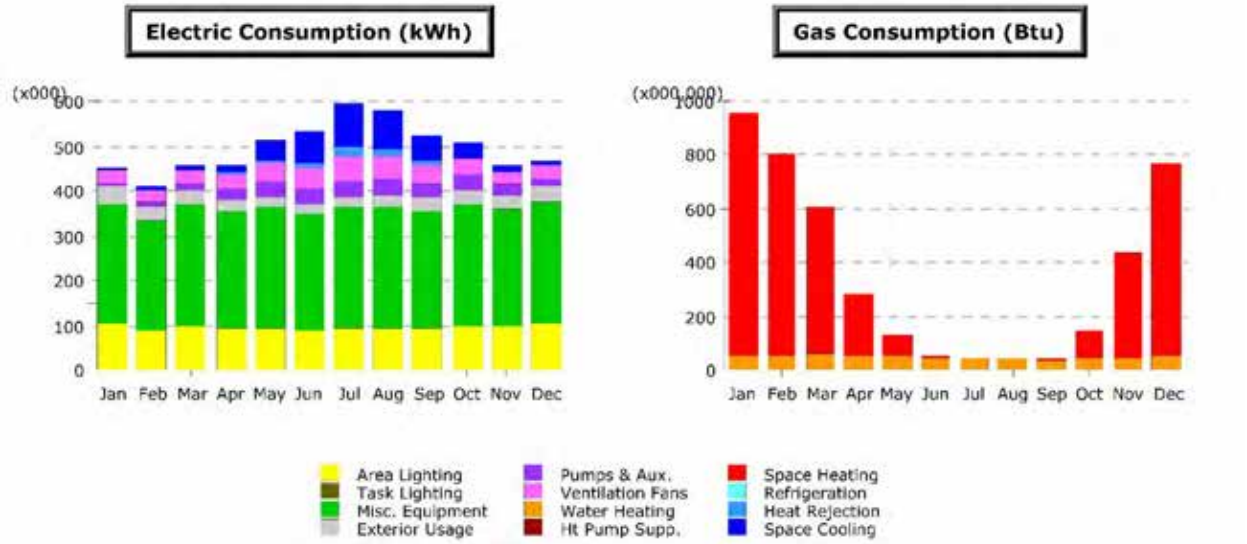


Electric Consumption (kWh x000)

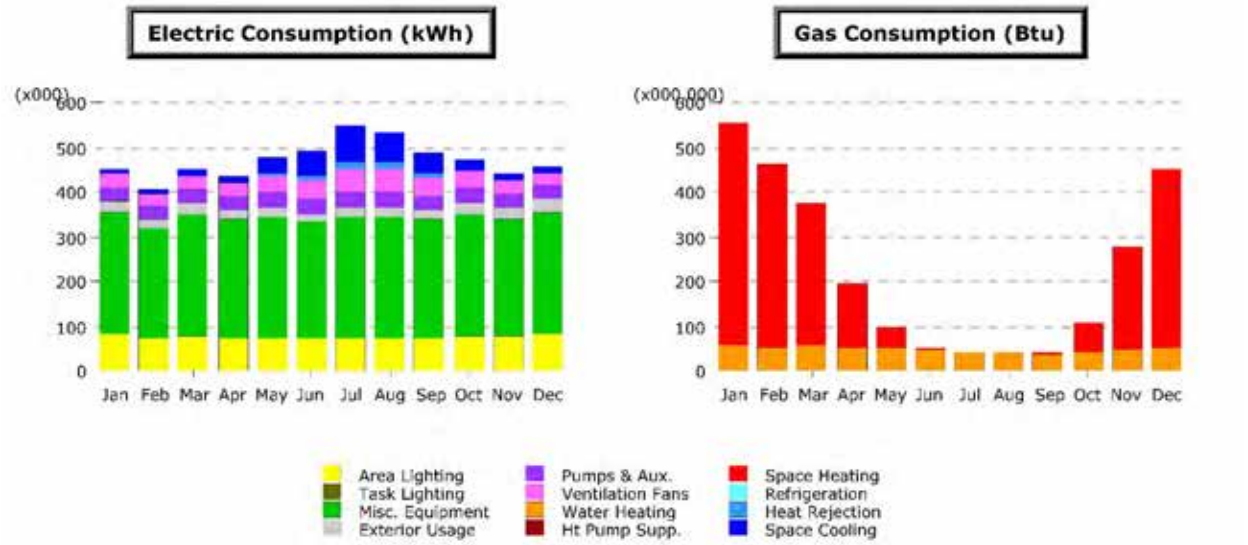
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	5.6	6.6	9.8	19.2	45.1	68.8	97.2	84.1	57.0	32.0	14.4	10.0	449.9
Heat Reject.	0.1	0.1	0.2	0.7	4.7	10.1	18.0	14.5	7.6	2.2	0.5	0.2	58.7
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	-	-	-	-	-	-	-	-	-	-	-	-	-
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	28.0	26.1	30.1	30.9	43.0	48.3	56.3	54.3	44.2	37.4	28.3	28.9	456.1
Pumps & Aux.	10.2	11.5	17.1	27.0	32.4	33.5	36.2	35.3	32.2	31.4	22.7	16.8	306.3
Ext. Usage	36.1	30.2	30.1	25.7	23.6	21.3	22.6	25.3	27.8	32.2	34.1	36.9	345.7
Misc. Equip.	270.1	244.5	271.5	264.0	271.5	262.6	271.6	271.5	262.6	271.6	259.4	271.6	3,192.5
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	101.5	89.0	96.9	90.3	92.1	86.7	90.6	92.0	92.1	98.7	97.8	102.1	1,129.8
Total	451.6	408.0	455.7	457.9	512.3	531.2	592.4	576.9	523.6	505.5	457.3	466.5	5,939.0

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	900.8	751.2	547.8	228.7	75.1	9.7	-	1.5	8.5	107.7	387.3	722.8	3,741.2
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	53.9	51.0	56.8	52.1	50.7	43.7	40.8	39.0	37.0	40.2	45.3	48.8	559.2
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	954.7	802.2	604.6	280.8	125.7	53.4	40.8	40.5	45.5	147.9	432.6	771.7	4,300.4

Figure 3-27 — Monthly eQUEST Building Model Results – Baseline Case

Terminal Expansion Proposed Run Date/Time: 06/26/14 @ 15:47



Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	12.1	11.4	14.2	18.5	36.0	55.1	80.7	69.4	45.8	26.4	15.7	14.0	399.3
Heat Reject.	0.3	0.3	0.4	1.0	4.9	9.8	17.4	14.0	7.8	2.6	0.8	0.5	59.8
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	1.2	1.0	0.9	0.5	0.2	0.0	0.0	0.0	0.0	0.2	0.7	1.0	5.7
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	27.7	25.6	29.3	30.0	40.7	45.6	52.8	51.0	41.4	35.6	27.6	28.3	435.5
Pumps & Aux.	31.0	28.1	31.6	31.3	33.4	33.2	35.8	34.8	32.7	33.0	31.0	30.8	386.7
Ext. Usage	28.9	24.2	24.1	20.6	18.9	17.0	18.1	20.2	22.2	25.7	27.3	29.5	276.8
Misc. Equip.	270.1	244.5	271.5	264.0	271.5	262.6	271.6	271.5	262.6	271.6	259.4	271.6	3,192.5
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	81.2	71.2	77.6	72.2	73.7	69.4	72.5	73.6	73.7	79.0	78.2	81.7	903.9
Total	452.5	406.2	449.6	438.1	479.2	492.7	548.9	534.5	486.2	474.2	440.8	457.3	5,660.2

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	500.3	412.0	315.3	142.0	49.2	6.2	1.7	1.6	6.2	66.8	229.6	402.5	2,133.3
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	53.9	51.0	56.8	52.1	50.7	43.7	40.8	39.0	37.0	40.2	45.4	48.8	559.3
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	554.2	463.0	372.1	194.0	99.9	49.9	42.5	40.6	43.2	107.0	274.9	451.3	2,692.6

Figure 3-28 — Monthly eQUEST Building Model Results – Proposed Case

As stated in the DEIR, a recent MEPA filing for an unrelated project[28] used publicly-available tools and calculators to estimate that a solar hot water system in Boston would generate about 120 MMBtu of useful heat per year per 1,000 sf of useful panel space. Scaling that estimate to the amount of space available for the SSX project at the South Station site mentioned above in the PV section, solar hot water was estimated to generate about 4,200 MMBtu per year. This exceeds the expected domestic hot water use for the terminal expansion, which is 559.3 MMBtu per year per Figure 3-28.

Similarly to the displacement of electricity from the grid discussed in the solar PV section above, solar hot water would displace heat energy in the form of boiler fuel usage. If the heat from the solar hot water displaces fuel use in a natural gas-fired boiler, the annual GHG savings equates to approximately 245 tons of CO_2.

Implementation challenges for solar hot water installation are related to excess supply, future shadowing, interconnections with Veolia steam, and available financial incentives.

The solar hot water system described above would exceed the expected domestic hot water use associated with the terminal expansion project. Additional uses/customers for this hot water would need to be identified (including possibly the existing South Station).

As discussed above, expected shadowing based on current nearby buildings is included in the analysis. However, future development in the area could easily add shadowing that would render the use of solar hot water nonviable.

Solar hot water systems typically interface with traditional hot water heaters. The use of solar hot water interconnected with a district steam-based hot water supply system could add complexity and create reliability issues.

The DEIR mentions the eligibility of these solar hot water systems for the federal energy Investment Tax Credit (ITC) program. The Massachusetts Clean Energy Center currently offers the Commonwealth Solar Hot Water Program (CSHW)[29] Commercial Scale also offers financial incentives for solar hot water feasibility studies and construction projects for commercial-scale buildings, and financing options. However, it is not clear whether funding would be available through the CSHW program at the time of SSX project construction. Similarly, solar hot water may qualify for Alternative Energy Credits (AEC) but the logistics of obtaining AECs are not currently established.

No specific permitting issues have been identified.

3.13.6. On-Site Combined Heat and Power

A third option for energy savings is the installation of an on-site combined heat and power (CHP) system. A gas-fired CHP system can produce electricity and hot water. CHP would reduce the need for natural gas for domestic hot water heating while providing a portion of the building's electricity needs.

CHP may be a feasible technology if the building can effectively use the otherwise-waste heat on a nearly continuous year-round basis. Based on the monthly eQUEST modeling results in Figure 3-27, the minimum natural gas combustion for heating is 40.6 MMBtu per month, which is about 0.05 MMBtu per hour. Any system sized to meet that thermal load would be small (5 or 10 kW). Vendor specifications for a 10kW micro-CHP are included in Appendix B, *Greenhouse Gas Analysis Documentation.*

[28] The Boston Garden, EEA# 15052, January 31, 2014.
[29] Massachusetts Clean Energy Center. http://www.masscec.com/solicitations/commonwealth-solar-hot-water-commercial-scale, accessed 7/30/2014.

A larger system could be designed to serve the domestic hot water needs, winter heating needs, and some or all of the summer cooling needs (through the use of absorption chillers). However, such a system would be idle during shoulder months (spring and fall) when neither significant building heat nor cooling is needed. Also, as discussed above electric interconnection issues are very likely to preclude use of on-site CHP larger than about 40 kW.

Calculations in Appendix B, *Greenhouse Gas Analysis Documentation,* show that for a 10 kW micro-CHP, expected fuel consumption is 940 MMBtu/year, which would displace 269 MMBtu/year of electricity and 446 MMbtu/year of boiler natural gas on a site basis. No net energy savings is predicted on a site basis.

CHP has been widely credited with reducing GHG emissions, but that is generally true only in relatively large systems because the efficiency of small CHP systems cannot compete with grid generated electricity.

Calculations in Appendix B, *Greenhouse Gas Analysis Documentation,* show that for a 10 kW micro-CHP, only a nominal GHG emissions reduction is expected (less than one ton per year).

As discussed above, electrical interconnection through spot network vaults could limit the size of the CHP. An on-site CHP would be redundant if solar hot water or connection to Veolia's district steam system is implemented. More generally, the size of the system makes it challenging to realize a significant GHG benefit.

No specific permitting issues have been identified.

3.13.7. Effect of Locomotive Plug-Ins

The GHG analysis for the transportation impacts due to plug-ins compares the greenhouse gas emissions from the no plug-in case to the case where the trains spend 3.5 hours[30] plugged in per layover. A "plug-in" refers to when the trains receive power from the grid-based ground power receptacles (also known as "shore power") at the layover facilities. When plugged in, the train can shut down the Head-End Power (HEP) generator on the locomotive for the duration of the layover. Regardless of whether or not a train gets plugged in, there is still the possibility of time spent idling on the diesel engine. This idling time can equate to up to one hour when plugged in, with 30 minutes upon entering and another 30 minutes before departing.

The GHG analysis calculates the amount of carbon dioxide the trains release for two different layover scenarios. In the first scenario, the diesel engine runs the entire layover time. In the second scenario, the diesel engine only runs for one hour with the rest of the time spent plugged in. The increase in capacity from this project is equivalent to 38 extra locomotives in layover mode per day with approximately eight coaches per locomotive, totaling 304 coaches. Each coach and locomotive spends approximately 3.5 hours plugged-in while on layover, which is the layover time that the comparison incorporates. This analysis also assumes that all 365 days of the year are equivalent, which does not take into account reduced weekend service.

The calculations for the plugged-in trains assume a 14.3 kilowatts average power load of a fleet average coach while in layover mode and 39.8 kilowatts average power load of a typical locomotive in layover mode. The total energy usage from the plug-ins results from the total number of coaches and locomotives, the average energy use for a layover, length of layover, and number of days in a year. The total electric

[30] An average mid-day layover is approximately 4.5 hours based on equipment cycles, of which 30 minutes after arrival and 30 minutes prior to departure is assumed to be spent idling on diesel. Trains are assumed to be plugged in to shore power for the remaining 3.5 hours.

load results from the addition of the electric load from the coaches and the electric load from the locomotives. The total electric load is approximately 7,486 Megawatt-hours per year. The electric powering of the trains results in indirect emissions of carbon dioxide to generate the electricity that is used. The indirect emissions of carbon dioxide equates to approximately 726 pounds of carbon dioxide per megawatt-hour. The resulting total indirect carbon dioxide emissions are 2,717 tons of carbon dioxide per year. This is an improvement of 18,933 tons of carbon dioxide per year by using the ground power receptacles instead of idling on the diesel engine. Calculations are included in Appendix B, *Greenhouse Gas Analysis Documentation*.

3.13.8. Indirect Emissions from Amtrak Trains

For the purposes of this analysis, eight new daily electric Amtrak trains were included as part of this project. For comparison with the transportation impacts presented in the DEIR, indirect emissions from Amtrak's electric locomotive service were calculated for train locomotives idling at South Station and moving to and from Tower 1 Interlocking. It is estimated that eight additional electric Amtrak trains would each spend approximately 30 minutes per day idling at South Station. Each coach is estimated to have a 50 kW standing load which equates to a 400 kW standing load for each 8-coach trainset. For eight trains idling 30 minutes at 400 kW, the electric usage is 1,600 kWh per day. There is also a 10 kWh electric usage per train to move from the Platform to Tower 1. For eight trains this is a total electric usage of 80 kWh per day. The total electric usage per day for the eight Amtrak trains is then the sum of these two numbers, 1,680 kWh per day.

This information in kilowatt hours per day (kWh/day) can be converted to tons of CO_2 per year following MEPA's instructions, which reference average electric grid emission rate from ISO New England. Assuming that the Amtrak trains run for 365 days a year at 1,680 kWh per day, the total electric usage for the year is 613.2 MWh. The average electric grid emission rate from ISO-NE is 726 pounds of CO_2 per MWh. The total emissions from the eight Amtrak trains would then be approximately 222.6 tons of CO_2 per year.

3.13.9. Applicable Energy Codes, Standards, and Rating Systems

The City of Boston has elected to include the state's optional Stretch (Energy) Code in its building requirements. Currently, the Stretch Code (SC1) is based on a reduction of energy use from the baseline defined in the 2007 International Energy Conservation Code (IECC). Very recently, the Board of Building Regulations and Standards (BBRS) proposed a draft of the 9th edition of the Code, which would include adoption of IECC 2015, with Massachusetts-specific amendments, and would include a revision to the Stretch Code (SC2). It is anticipated that the 9th edition and SC2 will be adopted in early 2016 and be effective sometime in the 2nd quarter of that year, although the final form it will take is currently unknown. The project would adhere to the Massachusetts Stretch Code standards that are in place at the time of the application for building permits.

MassDOT may consider implementation of Leadership in Energy and environmental Design (LEED) standards and the FHWA Infrastructure Voluntary Evaluation Sustainability Tool (INVEST) as guidance during final design.

3.14. Historic Resources

This section includes a description of potential impacts to historic resources, along with the following information, which was requested in the Secretary's Certificate:

- A matrix of potential effects for National Register-Listed or National Register-eligible historic architectural resources with the Preferred Alternative's Areas of Potential Effect (APE) (Section 3.14.2).

3.14.1. Impact Summary

MassDOT assessed potential project impacts to historic properties within and in the vicinity of the South Station site and the two layover facility sites relative to demolition activity, noise, vibration, visual, and historic rehabilitation impacts to historic properties as described below. As described below, at South Station, the project, implemented with noise mitigation and designed consistent with the historic preservation design principles, would have no adverse effect on historic properties. No historic properties would be affected in the vicinity of the layover facilities.

South Station

Table 3-15 provides a list of the historic resources within the South Station APE, their current historic designation, and recommendations for National Register eligibility.

Table 3-15 — Historic Resources within the South Station APE

Name	Historic Designation/Recommendation
Properties listed in the National and/or State Registers of Historic Places	
Fort Point Channel Historic District	Listed in National and State Registers
Leather District	Listed in National and State Registers
Russia Wharf Buildings	Listed in National and State Registers
South Station Headhouse	Listed in National and State Registers
Commercial Palace Historic District	Determined National Register eligible Listed in State Register
Fort Point Channel Landmark District	Listed in State Register (Boston Landmark District)
Properties included in the Inventory of Historic and Archaeological Assets of the Commonwealth	
Chester Guild, Hide and Leather Machine Company	Recommended National Register eligible
Chinatown District	Recommended National Register eligible
Federal Reserve Bank of Boston	Recommended National Register eligible
Kneeland Street Steam Heating Plant	Recommended National Register eligible
South End Industrial Area	Recommended National Register eligible
Keystone Building	Not evaluated; recommended for evaluation when building is 50 years old
Weld Building	Recommended National Register eligible
USPS GMF/South Postal Annex	Recommended not National Register eligible
MBTA Operations Center Power Substation	Not evaluated; recommended for evaluation when building is 50 years old
245 Summer Street	Not evaluated; recommended for evaluation when building is 50 years old
Properties Not Previously Surveyed	
Gillette	Recommended National Register eligible

The USPS GMF, which is located within the South Station APE, but is not a historic property, would be demolished. Neither direct alteration nor temporary construction impacts to the historic headhouse are anticipated as a result of the project. A wind study was not conducted for the project because as a nonwater-dependent infrastructure project subject to 310 CMR 9.55, it is not subject to the provisions of 310 CMR 9.51. In addition, since the new headhouse height would not exceed 80 feet, any impacts from wind are expected to be minimal.

Noise Impacts for Historic Resources

As described in Section 3.12.1, a moderate noise impact would be expected to occur at sensitive residential receptors within the Fort Point Channel Historic District due to the removal of the USPS facility. These noise impacts would be fully mitigated by the construction of a noise wall as described in Section 3.12.3. The primary source of noise at the existing historic headhouse is from the idling electric locomotives from the Amtrak trains that enter the station locomotive first. The project would be expected to reduce the operating noise levels at this location as a result of redistributing some Amtrak electric locomotive trains further away from the headhouse, as well as a reduction in idling times for all station locomotives. 245 Summer Street is expected to experience a moderate noise impact (an increase from 69.4 dBA to 71.1 dBA in peak hour Leq) due to the increase in idling of the Amtrak electric locomotives and the increase in the train operations on the new tracks at the north end of the station adjacent to 245 Summer Street.

At locations within the historic Leather District, the Ldn noise level is expected to decrease for two reasons. The expansion would add tracks to the east of South Station further from the Leather District and would distribute all the trains over a larger area and the project would also reduce the amount of train idling in the terminal area. This would also result in a reduction of the peak hour Leq noise level along Atlantic Avenue and within the Leather District.

At the South Station site, noise levels at receptors within the Fort Point Channel Historic District are expected to exceed the FTA moderate impact criterion of 61.7 dBA for residential receptors. As described in Section 3.12, Noise and Vibration, to reduce noise from idling locomotives across Fort Point Channel, a noise barrier would be installed along the length of the easternmost track.

The demolition and construction activity associated with the project would impact the South Station headhouse and 245 Summer Street (located within the APE but not a historic property). While construction noise levels from the project are not expected to exceed FTA construction noise limits, they are expected to exceed the more stringent City of Boston construction noise limits at the existing headhouse based on the assumed construction equipment mix. Temporary noise barriers or noise enclosures for equipment would be utilized to mitigate construction noise levels at these receptors. A Construction Noise Control Plan would be implemented to mitigate construction noise levels, including providing noise monitoring during construction to determine compliance with FTA and City of Boston construction noise limits.

Vibration Impacts for Historic Resources

The project would have no adverse effect on historic properties related to vibration impacts. Due to the slow speed of trains entering and leaving South Station (approximately 10 mph), train vibration levels would be below FTA criteria. Train activity at South Station is not expected to result in any ground-borne noise inside the building.

Vibration levels generated by the construction equipment proposed for this project would not result in structural damage to the existing headhouse or other nearby buildings, but could exceed the FTA human annoyance criterion of 72 VdB for train passengers on the nearby platforms.

Visual Impacts for Historic Resources

The project would have no adverse visual effect on views to or from historic properties included in the South Station APE. Currently, the district cannot be viewed from the southwest across Fort Point Channel because of prohibited access along Dorchester Avenue adjacent to the USPS facility. The completion of and public access to the Harborwalk along Dorchester Avenue would improve the views within the Fort

Point Channel Historic District across the Fort Point Channel. Views of the district would be improved because the Harborwalk would provide closer unimpeded views of the district across the Fort Point Channel as well as more-appealing views from the district across the Fort Point Channel towards the station.

The project would have no adverse visual impact on views to or from historic properties included within the APE. Although the station design has not been advanced beyond conceptual design, MassDOT intends for the station expansion to be consistent with the scale of the existing South Station headhouse.

Section 2.1.4 presents design principles to guide the planning and design of the SSX project. Specific to historic preservation, planning and design principles include the design being respectful of South Station's rich history, its prominent location, and its role as the transportation hub for the region; creating a work of civil architecture that complements the historic and architectural significance of the 1899 headhouse; and recognizing and protecting the historic integrity of the existing South Station headhouse and its value as a public space. The project would create a work of civic architecture that celebrates the sense of arrival and departure and whose components comprise an innovative and interesting design solution that complements the station's historic and architectural significance.

Layover Facilities

New construction at the two layover facility sites would include minimal vertical components; consequently noise, vibration, and visual impacts to historic properties within the APEs are not anticipated. New construction and/or expansion at the layover facility sites would be consistent with the surrounding industrial land uses.

Widett Circle

Existing food processing, food storage, and food logistics buildings to be demolished are located within the Widett Circle APE, but they are not historic properties. Train operation noise levels from Widett Circle would be below FTA moderate impact criteria of 68.1 dBA. Construction noise levels at the site are not expected to exceed FTA construction noise limits. Predicted new vibration at the site would not impact historic properties within the APE.

Readville – Yard 2

Noise impacts would occur at residences along Wolcott Street and Riley Road. While these areas are located within the APE, the impacted properties are not identified historic properties. Construction noise levels at the site are not expected to exceed FTA construction noise limits. Project vibration at the site would not impact historic properties within the APE.

3.14.2. Preliminary Determinations of Effect

MassDOT undertook a preliminary determination of effect analysis for historic properties located within the SSX APE, to determine whether the project would have an adverse effect upon the historical, architectural, or cultural characteristics of the historic properties. MassDOT utilized the Section 106 and Massachusetts Historical Commission (MHC) effect criteria (36 CFR 800.5 and 950 CMR 71.07(2)(b)) to determine if there would be "no historic properties affected" or if the project would have "no effect," "no adverse effect," or an "adverse effect" on historic properties. "Effect" means alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register. An adverse effect is found when an undertaking may have an effect that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

MassDOT applied the criteria to assist in consultation with the MHC in accordance with State Register Review procedures. The preliminary determinations of effect are summarized in Tables 3-16 and 3-17, and indicate either No Adverse Effect or No Effect for all historic properties. A Section 106 Report will be submitted to the MHC separately as part of the NEPA/Section 106 review process. That report will provide FRA determinations of effect in compliance with Section 106.

South Station

Multiple historic properties are located within the SSX APE. These resources are summarized in Table 3-16. The project would have "no effect" on a majority of the historic properties. No direct alteration of the historic headhouse is anticipated as a result of the project, and temporary construction impacts (temporary occupancy) are not anticipated. Project impacts to historic properties within the SSX APE would be limited to potential construction noise impacts to the South Station headhouse and potential operational noise impacts to the Fort Point Channel Historic District. As described in Section 3.16.4, a Construction Management Plan/Noise Control Plan would be implemented to assure construction noise would be in compliance with FTA and City of Boston construction noise limits. To minimize or eliminate adverse noise impacts to the Fort Point Channel Historic District, a noise barrier would be installed along the length of the easternmost track, as described in Section 3.12.3. These mitigation measures would effectively eliminate or minimize any potential adverse project impacts.

The project, as designed, would not have any adverse visual impacts on the South Station headhouse or surrounding historic properties.

MassDOT has preliminarily determined that the project, implemented with noise mitigation and designed consistent with the historic preservation design principles, would have no adverse effect on historic properties.

Table 3-16 — South Station Determinations of Effect

Name	Determination of Effect
Properties listed in the National and/or State Registers of Historic Places	
Leather District	No Effect
Russia Wharf Buildings	No Effect
Commercial Palace Historic District	No Effect
Fort Point Channel Historic District	No Adverse Effect
South Station Headhouse	No Adverse Effect
Fort Point Channel Landmark District	No Adverse Effect
Properties included in the Inventory of Historic and Archaeological Assets of the Commonwealth	
Chester Guild, Hide and Leather Machine Company	No Effect
Chinatown District	No Effect
Federal Reserve Bank of Boston	No Effect
Kneeland Street Steam Heating Plant	No Effect
South End Industrial Area	No Effect
Weld Building	No Effect
USPS General Mail Facility/South Postal Annex	No Historic Properties Affected- Recommended Not National Register Eligible
Properties Not Previously Surveyed	
Gillette	No Effect

Layover Facilities

As shown in Table 3-17, there are no historic properties within the Widett Circle or Readville – Yard 2 layover site study areas.

Table 3-17 — Layover Facility Determinations of Effect

Name	Determination of Effect
Widett Circle	No Historic Properties Affected
Readville – Yard 2	No Historic Properties Affected

3.15. Site Contamination and Hazardous Materials

This section includes a summary of the environmental conditions related to site contamination and hazardous materials, along with the following information, which was requested in the Secretary's Certificate:

- A draft site-specific health and safety plan (HASP) if any Recognized Environmental Conditions (RECs) are identified during the Phase 1 Environmental Site Assessments (ESA) (Section 3.15.2);
- A discussion of how Massachusetts Contingency Plan (MCP)-regulated conditions may impact construction techniques (i.e., dewatering, foundation types, etc.) or potential site infrastructure (e.g., groundwater and stormwater management) in the Preferred Alternative (Section 3.15.3); and
- A discussion of the potential implications of the Activity and Use Limitation (AUL) on the Readville – Yard 2 site that identifies the responsible party, includes plans for remediation, and describes how compliance with the MCP may impact layover facility design or the construction timeline (Section 3.15.4).

3.15.1. Impact Summary

Phase I ESAs were conducted to support the FEIR for the South Station site (with the exception of the USPS property, which was not available to be investigated) and the Widett Circle and Readville – Yard 2 layover facility sites. A Phase 1 ESA is a report that summarizes a site visit and records review of a property and its surrounding area to determine if any additional environmental investigation is warranted to understand the liability risks associated with the identified property. The goal of these assessments was to identify RECs and Historic Recognized Environmental Conditions (HRECs) associated with the properties.

South Station

The South Station site has a history of coal storage and has been used as a railyard since the late 1800s. The Phase I ESA identified three RECs and six HRECs for the site. The RECs include historical use of the site as a railroad transportation facility; the historical fill present at the site has been documented containing elevated concentrations of polynuclear aromatic hydrocarbons (PAH) and metals; and a release of hydraulic oil at the site. A Class A-3 Response Action Outcome (RAO) was submitted for the site, asserting that remedial work has been completed and a level of "no significant risk" was achieved. Contamination has not been reduced to background levels and an AUL has been implemented. AULs are legal restrictions used in the context of the Massachusetts Contingency Plan to limit future exposure to contaminants remaining at a site. A Phase II is a comprehensive site assessment during which the risks posed to public health, welfare, and the environment are determined. Based on the RECs identified, Phase I and II ESAs would be conducted when the USPS site is available to be investigated. This would determine the potential impact to future development caused by the identified RECs.

Layover Facilities

The Widett Circle site was created by the filling of South Bay, which was completed approximately 1967. Two RECs and seven HRECs were identified during the completion of the Phase I ESA. The RECs included the fill material used during the creation of the land area and the surrounding property's use as a railroad storage and maintenance facility. The seven HRECs identified included a 100-gallon release of diesel fuel and six releases of anhydrous ammonia, all of which were closed in accordance with MassDEP regulations.

The Readville – Yard 2 site has been used as a railyard since approximately 1917. The Phase I ESA identified four RECs and zero HRECs for the site. The first two RECs are associated with Release Tracking Number (RTN) 3-15991, and include impact of onsite soils with polychlorinated biphenyls (PCBs), asbestos, heavy metals, and petroleum compounds and impacts of PCBs, heavy metals, asbestos and petroleum compounds the adjacent property owned by James G. Grant Co, Inc. (the Grant property). The remaining RECs include stained soils in the area of the fire pump building and historical use of the site as a railroad storage and maintenance facility. An AUL has been recorded for the Grant property under RTN 3-15991.

Based on the RECs identified, a Phase II ESA would be conducted to determine the potential impact to future development caused by the identified RECs.

Phase II ESAs

Based on RECs identified, Phase II ESAs would be conducted at South Station, Widett Circle, and Readville – Yard 2. MassDOT would implement a soil and groundwater sampling and analysis program to provide information to establish the presence and extent of contaminated material; determine options available to manage and dispose surplus soil generated during construction; establish requirements for treatment and management of groundwater to be dewatered during construction; avoid exacerbation of existing groundwater or soil contamination in design for construction, and meet the performance standards of 310 CMR 40.0000 with regard to construction in contaminated areas.

Based on the Phase II investigation results, MassDOT would establish oil and hazardous material concentrations in soil and groundwater and determine if MCP reportable conditions exist. Potential effects of construction on existing areas of environmental contamination and conditions that may pose a significant risk to human health, safety, public welfare, or the environment, including Imminent Hazards and/or Critical Exposure Pathways, would be identified. MassDOT would develop recommendations for specific response actions to maintain compliance with the MCP related to Oil and Hazardous Materials (OHM) on the property. MassDOT would identify response actions to be conducted prior to construction.

MassDOT would conduct a visual inspection of buildings to be demolished to identify the presence, location, and quantity of suspect asbestos-containing materials (ACM) and other regulated materials. Work plans would be developed for sampling based on the facility walk-throughs once the inspections are complete. Bulk samples of potential hazardous materials would be collected for laboratory analysis. Once the laboratory results are received, types, conditions, and quantities of potential hazardous materials and universal wastes, including PCBs, lead paint, fluorescent light tubes, light ballasts, chlorofluorocarbons (CFCs) and refrigerants associated with HVAC systems, mercury switches, emergency light batteries, and exit signs, etc. would be documented and inventoried. Finally, response actions that would be required prior to demolition would be identified.

3.15.2. Site Specific Health and Safety Plan

Draft site specific health and safety plans (HASPs) for all three project sites are included in Appendix C, *Hazardous Materials Documentation.* These plans are intended to help manage risk to workers and others near AUL areas in the event of excavation or construction activities. The final plans would specifically identify the chemicals at the sites, the types of contaminated media present and the potential routes of

exposure. The plans would also indicate the appropriate level of protection needed and the type of monitoring required.

3.15.3. Impacts on Construction Techniques

The impacts to construction activities at the sites would vary based on the required activities. Site activities would be conducted in accordance with the MCP. A Release Abatement Measures (RAM) plan would be the likely mechanism under the MCP to complete the site activities. New issues identified during the Phase II ESA work would also require typical notification and assessment requirements. The primary impact to construction activities related to soil would be the requirement to implement appropriate soil management procedures throughout the construction schedule, including appropriate dust mitigation, proper stockpiling of soils, documentation of final soil conditions, and proper disposal of excess soils. The final site conditions may require the placement of an AUL for those sites that have not yet recorded one. While the Phase I ESAs did not determine potential groundwater impacts at the sites, based on previous site uses and other site conditions, it is expected that groundwater impacts may exist that could impact construction activities. Impacts to construction activities would mainly be related to construction dewatering. In addition, the potential for vapor intrusion to structures would need to be evaluated. Appropriate permitting and treatment would be required, which could have an impact on the construction schedule and costs. Construction impacts are further explored in Section 3.16, Construction Impacts.

3.15.4. Implications of the Activity and Use Limitation at Readville – Yard 2

An AUL exists on parts of the Readville – Yard 2 site. The AUL prohibits residential use, food consumption gardening practices, and site soil disturbance without Licensed Site Professional (LSP) oversight and requires maintenance of the existing temporary cap. Additional remediation activities are being performed at the site to address the presence of PCBs identified on the site and abutting property. Upon completion of the PCBs excavation a final cap is planned to replace the temporary cap. The AUL would remain on the site once the final cap is installed. It is unknown when the construction of the final cap would be completed. With the existing AUL on the site, future construction activities would require a RAM plan to be completed by an LSP and submitted to MassDEP prior to completing the work. Periodic RAM status reports would be required during construction and a RAM completion report would be submitted at the end of construction. The implementation of the construction activities associated with the RAM plan would require oversight by an LSP. The AUL is likely to remain in place at the completion of the construction activities.

3.16. Construction Impacts

This section includes a summary of the project's construction impacts, and also provides the following information requested in the Secretary's Certificate:

- A description of how Amtrak, MBTA commuter rail and light rail, bus, and freight service would be modified and accommodated during project construction (Section 3.16.2);
- An evaluation and description of potential construction period access locations and laydown areas for station, rail and layover facilities (Section 3.16.3); and
- A revised draft CMP, as necessary, to reflect the elements of the Preferred Alternative (Section 3.16.4).

3.16.1. Impact Summary

Construction – Water and Wastewater Systems

The proposed construction at South Station would avoid impacts to existing subsurface utilities via direct contact with pipes and structure, vibrations, or settling. The use of existing wastewater systems may be required during construction to provide a wastewater discharge for construction-time needs. Effort would be made to restrict construction over sewer and water mains. If there is a conflict between utilities and structural elements within the South Station site, those lines would be relocated. Every effort would be made to avoid impacting BWSC-owned facilities. Dewatering discharges would not be connected to the sewer system and would be done in accordance with local, state, and federal standards. If required, a Construction Dewatering Discharge Permit would be obtained. Details for mitigating utility impacts as well as dewatering strategies will be presented during the final design.

Construction – Air Quality

As detailed in DEIR Sections 6.3.1, Air Quality Impacts, and 6.4.2, Emissions Control Plan, temporary air quality impacts could result from construction activities associated with the project, including fugitive dust emissions, direct emissions from construction equipment, and increased emissions from motor vehicles on local streets due to traffic disruption. The anticipated temporary construction activity does not appear to be exceptional or atypical for this type of project. Due to the close proximity of construction activities to nearby businesses and other public areas, however, mitigation measures during construction would be required. The CMP would include an emissions control plan to address impacts of fugitive dust, construction equipment and vehicle exhaust, and any additional dust control considerations. The details of specific mitigation measures are included in the DEIR.

Construction – Noise

The results of the construction noise assessment indicate that the highest construction noise levels would occur during the demolition of the USPS facility and the construction of the headhouse. Because of the close proximity of the office building at 245 Summer Street to the construction activity, the construction noise levels at this location are expected to exceed the City of Boston construction noise limits during the demolition of the USPS facility, the construction of the headhouse, and the construction of the tracks and platforms. As a result, a temporary 18-foot high noise barrier should be installed between the construction site and the office building at 245 Summer Street. If pile driving is required during the construction of the headhouse, then a noise barrier should be installed, or other noise mitigation measures should be implemented such as pre-augering the hole to reduce the amount of pile driving required, and selecting a pile driver with a smaller hammer and foot-pound force rating.

As with other major construction projects in the City of Boston, the contractor would be required to submit a Construction Noise Control Plan (CNCP) to indicate proposed mitigation methods for construction noise mitigation, and to provide noise monitoring during construction to determine compliance with the City of Boston construction noise limits. The CNCP would provide a detailed list of construction equipment used in each construction phase, including the type and location of each piece of equipment.

Construction – Vibration

In addition to noise, vibration is also a major concern at 245 Summer Street, which has critical computer systems located in the basement of the building. As a result, outdoor vibration measurements would be obtained at 245 Summer Street during construction, especially during any pile driving activity, to ensure that the vibration levels do not exceed the FTA vibration criterion of 65 VdB for moderately vibration-sensitive equipment (vibration level in decibels referenced to 1 micro inch per second) for buildings where low vibration levels are essential for interior operations. During pile driving activity, vibration

levels should also be obtained inside the basement of 245 Summer Street to ensure that the vibration levels do not exceed the specification limits of the computers.

During construction at the South Station site, precondition surveys and vibration monitoring would be conducted to document initial conditions and to monitor vibration levels during construction. The CMP would establish vibration limits and other similar performance criteria, as well as require the contractor to plan and implement mitigating measures if adverse impacts were detected during construction. Below-grade work would be conducted under the technical monitoring of a geotechnical engineer to observe and document construction procedures, monitor vibrations, and anticipate and facilitate any needed mitigation measures.

Construction – Site Contamination and Hazardous Materials

As described in Section 3.15.2, there may be potential exposure of contaminated soils, debris or groundwater during construction.

3.16.2. Potential Service Modifications

To minimize impacts to rail services and passengers a construction phasing schedule would be utilized that balances and optimizes the duration and impact of overnight work windows, weekend work outages, and strategic track closures. As the project advances through preliminary design, MassDOT would coordinate with transportation providers and rail agencies to identify opportunities for strategic closures and alternatives for replacement services. MassDOT will also develop a communication plan for coordination with passengers, communities, and businesses potentially impacted by service disruptions.

An example of a strategic track closure would be to shut down for a period of time the Old Colony Line coming into South Station and allow around-the-clock construction at South Station on tracks impacted by this route. Commuter rail passengers would be bused to South Station or transferred from the Old Colony Line at Braintree to the Red Line. This would allow the contractor an extended work window.

Any outages along the NEC would impact Amtrak operations and maintenance activities. This could require overnight closures of South Station for Amtrak with use of Back Bay Station as a temporary replacement. Closures that would impact Amtrak's access to maintenance facilities would have to be planned in advance. Freight operations would not be impacted as operations are not in the construction vicinity. Construction associated with the South Station Bus Terminal connection would be coordinated to minimize any potential disruptions to bus service. Final construction staging/phasing would be determined as part of final design through discussions with MassDOT and project stakeholders.

Work at the layover facilities and within the Dorchester Avenue and the USPS property would occur with minimal impact to abutting properties and railroad operations, subject to state, local and agency provisions.

Passenger use most likely would not be affected during peak hours for the station. Disruptions would be largely minimized during other hours by completing utility connection work in non-public spaces, and utilizing non-revenue hours for public space connections. Once areas are no longer needed for construction activities, they would be returned to public use.

Noise and vibration impacts from construction are discussed in Section 3.12.1.

3.16.3. Construction Period Access Locations and Laydown Areas

The construction sites would be secured by fence enclosures that can also be closed completely during non-work hours. During work hours, workers on site would be required to carry proper identification and training cards. Visitors would be required to sign in at the construction entrance. Construction sites would maintain a security guard presence, as determined by state, local and agency requirements.

Laydown/staging locations are envisioned in the following locations:

- South Station: The existing Dorchester Avenue, currently closed to the public, would be used as a staging area for the demolition of the USPS facility. Once the USPS building is demolished and cleared, the former building site can be used for staging of the headhouse, rail work, and Dorchester Avenue construction;
- Widett Circle: It is anticipated that the yard construction can be staged in segments that would allow for staging to be done in a separate location within the property; and
- Readville – Yard 2: It is anticipated that the yard construction can be staged in segments that would allow for staging to be done in a separate location within the yard.

At South Station, all work would be completed by construction workers and materials via Dorchester Avenue. Construction access to the Widett Circle site would occur from Widett Circle, a local street immediately adjacent to the layover facility site that connects to Interstate 93 Frontage Road. All existing businesses in this location would be closed prior to construction, therefore no access to these businesses is required. Construction access to the Readville – Yard 2 site would occur from Wolcott Court, a local street immediately adjacent to the layover facility site and the only public roadway that provides access to this location. No traffic detours are expected to be necessary as a result of construction work at any of the project sites.

The contractor would be required to abide by the requirements set forth in MassDOT's *Supplemental Specifications to the 1988 English Standard Specifications for Highways and Bridges*, dated July 1, 2015. The rail and local agencies also identify these requirements in their specifications. In an effort to minimize contradicting or redundant language in the construction contract(s), the specifications would reference the specifications of only the procuring agency. Any additional requirements would be added to the special provisions of the specifications.

3.16.4. Revised Construction Management Plan (CMP)

A revised CMP is included in Appendix G, *Construction Management Plan*. Prior to the start of work, the SSX project contractors would be required to develop a detailed CMP for the SSX project. The CMP would be prepared in accordance with the requirements noted above, and would be implemented in phases that correspond with construction staging and sequencing. Of particular importance would be a plan to open project elements for public access as soon as they are no longer needed to safely perform work (i.e. Harborwalk).The CMP would consist of a detailed plan to address construction period impacts to various environmental resources, and would address vehicular traffic, pedestrian and bicycle facilities, on-street parking, public access, emergency access to local businesses and residences, dust, noise, odor, rodents, and construction-related nuisance conditions. MassDOT would coordinate the development and review of the CMP with the City and emergency personnel to ensure that appropriate safety measures would be incorporated throughout construction.

Appendix G, *Construction Management Plan*, addresses the following construction elements:

- Air Quality Impacts
- Soil Erosion and Sediment Control

- Noise and Vibration Impacts
- Traffic Impacts
- Work Hours

Additional noise and vibration control BMPs and mitigation measures during construction would be described in the CMP and CNCP, and could include the following:

- Installing temporary noise barriers;
- Applying acoustic enclosures and setting acoustic shield requirements for jackhammers, chainsaws, and pavement breakers;
- Establishing protocols for reporting noise monitoring results, noise reduction measures used, and responses to the community;
- Locating stationary construction equipment as far as possible from noise-sensitive sites;
- Constructing noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receptors;
- Monitoring noise after service starts (with the proposed mitigation in place) to evaluate whether the actual noise levels correspond with the modeled values and take appropriate corrective actions if the actual values are found to be higher than the projections;
- Minimizing and/or avoiding the use of impact and vibratory equipment that generates higher vibration levels (104 to 110 VdB at a distance of 25 feet from the pile driver), to avoid potential damage to buildings located within 65 feet of such equipment; and
- If pile driving is required, considering use of pre-augering holes to reduce vibration impacts.

Chapter 4 – Proposed Section 61 Findings and Mitigation

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4. Proposed Section 61 Findings and Mitigation

4.1. Introduction

In accordance with Massachusetts General Law (M.G.L.) c. 30, Section 61 and 301 CMR 11.12(5), any State Agency that takes Action on a project for which the Secretary required an Environmental Impact Report (EIR) shall determine whether the project is likely, directly or indirectly, to cause Damage to the Environment and shall make a finding describing the Damage to the Environment and confirming that all feasible measures have been taken to avoid or minimize the Damage to the Environment.

According to *Contents of Section 61 Findings* (301 CMR 11.12(5)(a)), in all cases, the Agency shall base its Section 61 Findings on the EIR and shall specify in detail: all feasible measures to be taken by the Proponent or any other Agency or Person to avoid Damage to the Environment or, to the extent that Damage to the Environment cannot be avoided, to minimize and mitigate Damage to the Environment to the maximum extent practicable; an Agency or Person responsible for funding and implementing mitigation measures, if not the Proponent; and the anticipated implementation schedule that will ensure that mitigation measures shall be implemented prior to or when appropriate in relation to environmental impacts.

According to *Section 61 Findings and Agency Action* (301 CMR 11.12(5)(b)), provided that mitigation measures are specified as conditions to or restrictions on the Agency Action, the Agency shall:

- Make its Section 61 Findings part of the Permit, contract, or other document allowing or approving the Agency Action, which may include additional conditions to or restrictions on the project in accordance with other applicable statutes and regulations; or

- Refer in its Section 61 Findings to applicable sections of the relevant Permit, contract, or other document approving or allowing the Agency Action.

Subject Matter Jurisdiction Limitations (301 CMR 11.12(5)(c)): In the case of a Project undertaken by a person that requires state permits or land transfers, but no funding, the Scope of any EIR is limited to those aspects of the project that are within the subject matter of the permit(s) or within the area subject to a land transfer that are likely, directly or indirectly, to cause damage to the environment. Any Participating Agency shall limit its Section 61 Findings, or any mitigation measures specified as conditions to or restrictions on the Agency Action, to those aspects to the Project that are within the subject matter of any required Permit or within the area subject to a Land Transfer. In the words of the MEPA statute (M.G.L. ch.30, sec. 62A), "Any finding required by Section 61 shall be limited to those matters which are within the scope of the environmental impact report, if any, required by this section."

State Agencies that will be required to make Section 61 Findings for the project prior to issuing permits for, funding, or otherwise implementing the project would include MassDEP, MassDOT, MHC, and MWRA.

Depending on agency procedures, as described above, the various Section 61 Findings may be part of permits or agency actions, or may be stand-alone documents. Moreover, agencies will generally limit Section 61 Findings to impacts and mitigation within the scope of the subject matter of their permits (e.g., MassDEP Section 61 findings will address wastewater, if the project requires a permit related to wastewater).

The proposed Section 61 Findings below and the subsequent sections contain commitments MassDOT has made as a basis for respective agency Section 61 Findings. A summary of the project's impacts and mitigation measures is presented for each site in Tables 4-2, 4-3, and 4-4.

4.1.1. Project Description

In cooperation with the Federal Railroad Administration (FRA), Amtrak, and the Massachusetts Bay Transportation Authority (MBTA), MassDOT is proposing expansion of Boston South Station to support existing Northeast Corridor (NEC) and commuter rail services, to provide for future Amtrak and MBTA service expansions, and to address existing and future intercity and commuter rail service layover needs. The SSX project includes planning, environmental reviews, and preliminary engineering for four primary elements:

- Expand the South Station Terminal facilities by adding seven tracks and four new platforms for a total of 20 tracks and 11 platforms, and constructing a new expanded headhouse and other passenger amenities;
- Reopen Dorchester Avenue and extend the Harborwalk resulting in the addition of more than one acre of open space for a continuous public walkway to the area; completing the current gap that exists in what would otherwise be a continuous pathway for pedestrians and cyclists along the Boston waterfront; and providing landscaping and street furniture;
- Acquire and demolish the U.S. Postal Service (USPS) Facility located on Dorchester Avenue adjacent to South Station, to provide an approximately 14-acre site on which to expand South Station; and
- Provide adequate rail vehicle layover space by expanding or constructing facilities at one or more sites in proximity to South Station to meet existing and proposed layover facility program needs and railroad operational requirements.

The approximately 49-acre South Station site includes the following existing facilities: South Station Rail Terminal, Bus Terminal, and the USPS parcel. The two potential layover sites under consideration consist of the approximately 30.2-acre Widett Circle site and the approximately 17.5-acre Readville – Yard 2 site.

4.1.2. MEPA History

MassDOT filed the Environmental Notification Form (ENF) for the SSX project on March 15, 2013. The ENF (EEA No. 15028) was noticed in the Environmental Monitor on March 20, 2013, and was available for public comment through April 9, 2013. MEPA held a public scoping meeting on April 1, 2013 at South Station, presenting a project overview and soliciting public input on the project. The Secretary's Certificate on the ENF, published on April 19, 2013, required the preparation of a mandatory DEIR.

The DEIR was filed on October 31, 2014, noticed in the Environmental Monitor on November 5, 2014, and available for public comment for an extended 49-day period through December 19, 2014. MEPA held a public hearing at the Boston Children's Museum on November 18, 2014 to review the DEIR and respond to questions and comments from the public. The Secretary of EEA published the Certificate on the DEIR on December 31, 2014 and determined that the project required the preparation of a mandatory FEIR. In accordance with MEPA regulations, 301 CMR 11.00 (revised, May 10, 2013), and the Certificate of the Secretary on the DEIR (December 31, 2014), MassDOT has prepared the FEIR for the SSX project, which responds to the requirements of the Secretary's Certificate.

4.2. Proposed Draft Section 61 Finding

The language in the following paragraphs is a proposed Section 61 Finding that extends to cover all potential impacts of the SSX project and could be adopted by the MassDOT, MHC, Massachusetts Water Resource Authority (MWRA), or other state agency with permitting responsibilities (as shown in Table 4-1, Required State Agency Actions).

Project Name: South Station Expansion (SSX) project

Project Location: Boston

Project Proponent: Massachusetts Department of Transportation, Office of Transportation Planning

EEA Number: 15028

Date Noticed in Monitor: June 22, 2016

This Section 61 Finding for the South Station Expansion (SSX) project (EEA No. 15028) has been prepared in accordance with the provisions of M.G.L. Chapter 30, Section 61 and 301 CMR 11.07(6)(k).

The potential environmental impacts of the SSX project have been characterized and quantified in the SSX project ENF, DEIR, and this FEIR, which is incorporated by reference into this Section 61 Finding. To the greatest extent practicable, MassDOT has taken all feasible measures to avoid and/or minimize adverse environmental impacts of the proposed SSX project. Where impacts are not avoidable, MassDOT has worked throughout the planning and environmental review process to develop measures to mitigate impacts of the SSX project to the extent practicable. With the implementation of the proposed mitigation, conducted in cooperation with state agencies, the [Agency Name] finds that there are no significant unmitigated impacts.

MassDOT recognizes that the identification of effective mitigation, and implementation of that mitigation throughout the life of the SSX project, is central to its responsibilities under MEPA. Accordingly, MassDOT has prepared a Table of Mitigation Commitments (Tables 4-2 through 4-4 in the FEIR) that specifies, for each potential state permit, the mitigation that MassDOT would provide. In the Table of Mitigation Commitments, MassDOT provides clear commitments to implement the mitigation measures; estimates the costs of each proposed measure; identifies the parties responsible for implementation of measures; and provides a schedule for their implementation based upon project phasing.

The [Agency Name] has reviewed the MEPA filings for the SSX project, and finds that the environmental impacts resulting from construction of the SSX project are those impacts as described in the DEIR and FEIR, which would be updated as needed in permit applications submitted for compliance with federal and state environmental laws. Pursuant to M.G.L. Chapter 30, Section 61, the [Agency] finds that with the implementation of mitigation measures as identified in the Table of Mitigation Commitments, all practicable and feasible means and measures would have been taken to avoid or minimize potential damage to the environment due to the construction and operation of the SSX project. In making this finding, the [Agency] has considered reasonably foreseeable climate change impacts and effects such as predicted sea level rise.

Table 4-1 — Required State Agency Actions

State Agency	Action	South Station	Widett Circle	Readville – Yard 2
Massachusetts Department of Environmental Protection (MassDEP)	Chapter 91 Waterways License	yes	no	no
	Stormwater Management Standards Compliance Review	yes	yes	yes
	Sewer Extension/Connection Compliance Certification	yes	yes	yes
	Massachusetts Contingency Plan (MCP) Review	yes	yes	yes
	Construction/Demolition Notification	yes	yes	yes
	Asbestos Notification[a]	yes	yes	yes
	Section 401 Water Quality Certificate	no	no	if required[b]
Massachusetts Department of Public Safety	Building Permit	yes	yes	yes
Massachusetts Executive Office of Energy and Environmental Affairs (EEA)	MEPA Review and FEIR Certificate	yes	yes	yes
	Public Benefit Determination	yes	yes	no
Massachusetts Historical Commission (MHC)	State Register Review	yes	yes	yes
Massachusetts Water Resources Authority (MWRA)	8(m) Permit	if required	if required	if required
	Temporary Construction Site Dewatering Discharge Permit	if required	if required	if required

a Asbestos Notification to MassDEP suffices for Notification to Massachusetts Department of Labor and Workforce Development, Division of Occupational Safety (DOS)
b To be determined by USACE whether a Section 401 water quality certification is required for work within the isolated vegetated wetlands.

4.3. Project Mitigation

MassDOT has reviewed the environmental effects of the SSX project and finds that all feasible measures have been taken first to avoid and then minimize any impacts. Since the filing of the DEIR, MassDOT has selected a preferred alternative that does not include joint development, thereby eliminating or reducing many of the potential environmental impacts of the project associated with those development scenarios.

Since the preferred alternative is the Transportation Improvement Only Alternative (DEIR Alternative 1), which does not include non-transportation-related development or associated traffic generation, tying mitigation to specific building-related thresholds and development phases, as requested in the Secretary's Certificate on the DEIR, would, therefore, not be applicable in this case. The project design would be sequenced so that water demand, wastewater, power, and other utility needs would be incorporated into the construction sequencing to accommodate additional system demands, if required.

4.3.1. Overview of Project Mitigation Commitments

This section includes the following information, which was requested in the Secretary's Certificate:

- Clear commitments to implement mitigation measures;
- Identification of the parties responsible for implementation;
- An estimate of the individual costs of each proposed measure; and
- A schedule for implementation.

Tables 4-2 through 4-4 provide a list of permanent, temporary, and construction-related impacts and associated mitigation measures. They also identify the responsible party for implementation, the estimated cost of the mitigation, and the preliminary implementation schedule. More specific, detailed mitigation measures would be developed as the project design advances, and would be reviewed by the appropriate regulatory agencies as part of project permit applications. Temporary, short-term impacts from construction activities would be mitigated to the extent practicable. Construction-period mitigation requirements would be incorporated into the final design plans and specifications that would serve as the basis for construction contract documents and specifications.

Table 4-2 – South Station – Summary of Impacts and Project Mitigation Commitments

Environmental Impact	Mitigation Measure	Responsible Party	Estimated Cost	Schedule
Land Use and Property				
Acquire USPS property	Minimize footprint required to support site function. All property acquisitions and relocations would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, 42 USC 4601; CFR 49 Part 24 and/or M.G.L. 79; M.G.L. 79A through the MBTA's real estate acquisition team.	MassDOT	N/A	During final design
Acquire parcel adjacent to 245 Summer Street to reopen Dorchester Avenue.	Minimize footprint required to support site function. All property acquisitions and relocations would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, 42 USC 4601; CFR 49 Part 24 and/or M.G.L. 79; M.G.L. 79A through the MBTA's real estate acquisition team.	MassDOT	N/A	During final design
Wetlands				
Direct impact to approximately 2.9 acres of Land Subject to Coastal Storm Flowage (LSCSF).	Implement soil erosion and sediment controls for construction activity proximate to wetland resources.	Contractor	TBD	During construction
	Comply with any conditions required by the Conservation Commission.	Contractor	TBD	During construction
Direct impact to approximately 700 linear feet of coastal bank	Comply with the performance standards for coastal bank listed in 310 CMR 10.3 (6) through (8).	MassDOT	TBD	During final design
	Implement soil erosion and sediment controls for construction activity proximate to wetland resources.	Contractor	TBD	During construction
	Comply with any conditions required by the Conservation Commission.	Contractor	TBD	During construction

Environmental Impact	Mitigation Measure	Responsible Party	Estimated Cost	Schedule
Direct impact to approximately 7.9 acres of coastal bank 100-foot buffer zone	Implement soil erosion and sediment controls for construction activity proximate to wetland resources.	Contractor	TBD	During construction
	Comply with any conditions required by the Conservation Commission.	Contractor	TBD	During construction
Chapter 91 Waterways and Tidelands				
Expands existing transportation infrastructure in filled tidelands.	Obtain a Chapter 91 license for new nonwater-dependent infrastructure project.	MassDOT	N/A	Prior to construction
	Obtain a Public Benefits Determination.	MassDOT	N/A	Prior to construction
Water Quality and Stormwater				
Impacts peak flow rates, runoff volumes, groundwater recharge volumes, and water quality	Design and install structural and nonstructural stormwater BMPs to mitigate changes in stormwater peak flow rates, runoff volumes, groundwater recharge volumes, and water quality, and limit impact from construction and operation on nearby water bodies.	MassDOT	$3,500,000	During final design and prior to construction
	Prepare site-specific Stormwater Pollution Prevention Plans (SWPPPs).	MassDOT	N/A	Prior to construction
	Develop detailed Operation and Maintenance (O&M) plan for each site.	MassDOT	N/A	During final design and prior to construction
Water Supply and Wastewater				
Increases water use and wastewater generation by approximately 44% over existing conditions.	Incorporate water efficiency measures to minimize the use of water and wastewater generation.	MassDOT	N/A	During final design
	Develop an Inflow/Infiltration (I/I) plan to mitigate for increased flows at the South Station site, including evaluating sewer systems that are hydraulically connected to the mains in the vicinity of the South Station site to potentially meet I/I requirements.	Contractor	N/A	During final design

Environmental Impact	Mitigation Measure	Responsible Party	Estimated Cost	Schedule
Traffic and Transportation				
Decreases Level of Service (LOS) at three intersections.	Implement roadway, bicycle, and pedestrian improvement at eight signalized intersections to increase LOS and improve operating conditions and quality of service.	MassDOT	$950,000	Prior to start of operations
Climate Change				
Subject to flooding from 1% annual chance flood event with 3.2 feet of sea level rise by the year 2070.	Raise portion of the seawall to help mitigate flooding from projected two feet of sea level rise by the year 2050.	MassDOT	TBD	During design and construction
	Select and implement additional site-specific elements for mitigation of flooding due to rising seas, storm surge and hurricane impacts.	MassDOT	TBD	During final design and prior to construction
	Ensure drainage systems are sized for future climate conditions where necessary.	Contractor	N/A	During design and construction
Subject to increasing incidence of extreme heat events.	Consider sustainable design guidelines to alleviate extreme heat in buildings.	MassDOT	N/A	During final design
Noise and Vibration				
Prior to mitigation, moderate noise impact is projected at 245 Summer Street and across Fort Point Channel at Necco Street due to removal of noise buffering USPS facility.	Install up to 1,450-foot long noise barrier at South Station site extending along the length of the easternmost track and approximately 18 feet high.	MassDOT	$1,600,000	During construction
Site Contamination/ Hazardous Materials				
Potential exposure of contaminated soils, debris or groundwater during construction.	Complete Phase II Environmental Site Assessments (ESAs).	MassDOT	TBD	During final design
	Identify Asbestos-Containing Materials (ACMs) and hazardous materials prior to demolition.	MassDOT	TBD	During final design
	Implement appropriate soil management procedures throughout the construction schedule.	MassDOT	TBD	Prior to demolition
	Obtain appropriate permitting and implement treatment for any contaminated groundwater.	MassDOT	TBD	Prior to/during construction
	Prepare and implement site specific Health and Safety Plan (HASP).	MassDOT	TBD	Prior to/during construction

Environmental Impact	Mitigation Measure	Responsible Party	Estimated Cost	Schedule
	Complete all reports required under the MCP. Submit to MassDEP.	Contractor	TBD	Prior to/during construction
Construction Impacts				
Temporary rail service impacts.	Prepare and implement the construction-phasing schedule that balances duration and impact by optimizing overnight work windows, weekend work outages, and strategic track closures.	MassDOT/ Contractor	N/A	Prior to and during construction
Temporary traffic disruption and congestion.	Follow MassDOT's specifications for traffic management requirements and work hour provisions.	Contractor	N/A	Prior to/during construction
Temporary construction impacts may include fugitive dust emissions, direct emissions from construction equipment, and increased emissions from motor vehicles.	Prepare a CMP to minimize potential impacts throughout construction	MassDOT	$30,000	Prior to construction
	Submit and implement a Dust and Emissions Control Plan.	Contractor	TBD	Prior to/during construction
Construction noise levels may exceed City of Boston noise limits, but work would be completed in accordance with the City of Boston's noise control ordinances.	Implement the Construction Noise Control Plan.	MassDOT	N/A	During construction
Construction vibration levels may exceed FTA criterion for human annoyance.	Monitor vibration levels during construction and anticipate and facilitate any needed mitigation measures.	Contractor	TBD	During Construction
May impact wetland resource areas.	Implement Soil Erosion and Sediment Control measures. Follow provisions in BWSC Stormwater Permit and MWRA 8(m) Permit.	MassDOT	TBD	During construction

TBD = To be determined
N/A = Cost not applicable for this item

Table 4-3 – Widett Circle – Summary of Impacts and Project Mitigation Commitments

Environmental Impact	Mitigation Measure	Responsible Party	Estimated Cost	Schedule
Land Use and Property				
Acquire Cold Storage and New Boston Food Market properties.	Minimize footprint required to support site function. Pay fair market value.	MassDOT	N/A	During final design
Acquire small portion of Department of Public Works facility property.	Minimize footprint required to support site function. Pay fair market value. Minimize impact to operations and maintain existing use.	MassDOT	N/A	During final design
Water Quality and Stormwater				
Impacts peak flow rates, runoff volumes, groundwater recharge volumes, and water quality	Design and install structural and nonstructural stormwater BMPs to mitigate changes in stormwater peak flow rates, runoff volumes, groundwater recharge volumes, and water quality, and limit impact from construction and operation on nearby water bodies.	MassDOT	Cost is included in Table 4-2.	During final design and prior to construction
	Prepare site-specific Stormwater Pollution Prevention Plans (SWPPPs).	MassDOT	N/A	Prior to construction
	Develop detailed Operation and Maintenance (O&M) plan for each site.	MassDOT	N/A	During final design and prior to construction
Climate Change				
Subject to flooding from 1% annual chance flood with 3.2 feet of sea level rise by the year 2070.	Select and implement site-specific elements for mitigation of flooding due to rising seas, storm surge and hurricane impacts.	MassDOT	TBD	During final design and prior to construction
	Ensure drainage systems are sized for future climate conditions where necessary.	Contractor	N/A	During design and construction
Subject to increasing incidence of extreme heat events.	Consider sustainable design guidelines to alleviate extreme heat in buildings.	MassDOT	N/A	During final design
Site Contamination/ Hazardous Materials				
Potential exposure of contaminated soils, debris or groundwater during construction.	Complete Phase II ESAs.	MassDOT	TBD	During final design
	Identify ACMs and hazardous materials prior to demolition.	MassDOT	TBD	During final design

Environmental Impact	Mitigation Measure	Responsible Party	Estimated Cost	Schedule
	Implement appropriate soil management procedures throughout the construction schedule.	MassDOT	TBD	Prior to demolition
	Obtain appropriate permitting and implement treatment for any contaminated groundwater.	MassDOT	TBD	Prior to/during construction
	Prepare and implement site specific Health and Safety Plan (HASP).	MassDOT	TBD	Prior to/during construction
	Complete all reports required under the MCP. Submit to MassDEP.	Contractor	TBD	Prior to/during construction
Construction Impacts				
Temporary construction impacts may include fugitive dust emissions, direct emissions from construction equipment, and increased emissions from motor vehicles.	Prepare a CMP to minimize potential impacts throughout construction.	MassDOT	Cost is included in Table 4-2.	Prior to construction
	Submit and implement a Dust and Emissions Control Plan.	Contractor	TBD	Prior to/during construction
Potential exposure of contaminated soils, debris or groundwater during construction.	Implement appropriate soil management procedures throughout the construction schedule.	MassDOT	TBD	Prior to demolition
	Obtain appropriate permitting and implement treatment for any contaminated groundwater.	MassDOT	TBD	Prior to/during construction
	Prepare and implement site specific Health and Safety Plan (HASP).	MassDOT	TBD	Prior to/during construction
	Complete all reports required under the MCP. Submit to MassDEP.	Contractor	TBD	Prior to/during construction

TBD = To be determined
N/A = Cost not applicable for this item

Table 4-4 – Readville – Yard 2 – Summary of Impacts and Project Mitigation Commitments

Environmental Impact	Mitigation Measure	Responsible Party	Estimated Cost	Schedule
Land Use and Property				
Partial acquisition of James G. Grant Co. LLC property	Minimize footprint required to support site function. Pay fair market value.	MassDOT	N/A	During final design
Wetlands				
Direct impact to approximately 0.04 acres of Riverfront Area.	Implement soil erosion and sediment controls for construction activity proximate to wetland resources.	Contractor	TBD	During construction
	Comply with any conditions required by the Conservation Commission.	Contractor	TBD	During construction
	Comply with the performance standards for Riverfront Area listed in 310 CMR 10.58 (4).	MassDOT	TBD	During final design
Direct impact to 0.4 acres of 100-foot buffer zone.	Implement soil erosion and sediment controls for construction activity proximate to wetland resources.	Contractor	TBD	During construction
	Comply with any conditions required by the Conservation Commission.	Contractor	TBD	During construction
Water Quality and Stormwater				
Increases impervious cover by 2.0 acres. Impacts peak flow rates, runoff volumes, groundwater recharge volumes, and water quality	Design and install structural and nonstructural stormwater BMPs to mitigate changes in stormwater peak flow rates, runoff volumes, groundwater recharge volumes, and water quality, and limit impact from construction and operation on nearby water bodies.	MassDOT	Cost is included in Table 4-2.	During final design and prior to construction
	Prepare site-specific Stormwater Pollution Prevention Plans (SWPPPs).	MassDOT	N/A	Prior to construction
	Develop detailed Operation and Maintenance (O&M) plan for each site.	MassDOT	N/A	During final design and prior to construction

Environmental Impact	Mitigation Measure	Responsible Party	Estimated Cost	Schedule
Water Supply and Wastewater				
Increases water use and wastewater generation by approximately 80% over existing conditions.	Incorporate water efficiency measures to minimize the use of water and wastewater generation.	MassDOT	N/A	During final design
	Develop an I/I plan to mitigate for increased flows at the South Station site, including evaluating sewer systems that are hydraulically connected to the mains in the vicinity of the South Station site to potentially meet I/I requirements.	Contractor	N/A	During final design
Climate Change				
Subject to increasing incidence of extreme heat events.	Consider sustainable design guidelines to alleviate extreme heat in buildings.	MassDOT	N/A	During final design
Noise and Vibration				
Prior to mitigation, moderate noise impact is projected along Wolcott Street and Riley Road.	Extend existing noise barrier at Readville – Yard 2 to up to 600 feet and approximately 18 feet high.	MassDOT	$400,000	During construction
Site Contamination/ Hazardous Materials				
Potential exposure of contaminated soils, debris or groundwater during construction.	Complete Phase II ESAs.	MassDOT	TBD	During final design
	Identify ACMs and hazardous materials prior to demolition.	MassDOT	TBD	During final design
	Implement appropriate soil management procedures throughout the construction schedule.	MassDOT	TBD	Prior to demolition
	Obtain appropriate permitting and implement treatment for any contaminated groundwater.	MassDOT	TBD	Prior to/during construction
	Prepare and implement site specific Health and Safety Plan (HASP).	MassDOT	TBD	Prior to/during construction
	Complete all reports required under the MCP. Submit to MassDEP.	Contractor	TBD	Prior to/during construction

Environmental Impact	Mitigation Measure	Responsible Party	Estimated Cost	Schedule
Construction Impacts				
Temporary construction impacts may include fugitive dust emissions, direct emissions from construction equipment, and increased emissions from motor vehicles.	Prepare a CMP to minimize potential impacts throughout construction.	MassDOT	$30,000	Prior to construction
	Submit and implement a Dust and Emissions Control Plan.	Contractor	TBD	Prior to/during construction
Construction noise levels may exceed City of Boston noise limits, but work would be completed in accordance with the City of Boston's noise control ordinances.	Implement the Construction Noise Control Plan.	MassDOT	N/A	During construction
May impact wetland resource areas.	Implement Soil Erosion and Sediment Control measures. Follow provisions in BWSC Stormwater Permit and MWRA 8(m) Permit.	MassDOT	TBD	During construction
Potential exposure of contaminated soils, debris or groundwater during construction.	Implement appropriate soil management procedures throughout the construction schedule.	MassDOT	TBD	Prior to demolition
	Obtain appropriate permitting and implement treatment for any contaminated groundwater.	MassDOT	TBD	Prior to/during construction
	Prepare and implement site specific Health and Safety Plan (HASP).	MassDOT	TBD	Prior to/during construction
	Complete all reports required under the MCP. Submit to MassDEP.	Contractor	TBD	Prior to/during construction

TBD = To be determined
N/A = Cost not applicable for this item

Chapter 5 – Response to Comments on the DEIR

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5.1. Introduction

This Chapter presents comments received on the DEIR (EEA No. 15028). Section 5.2 includes the Certificate of the Secretary of Energy and Environmental Affairs dated December 31, 2014. Section 5.3 provides the original comment documents (including letters and emails) annotated with unique identifying codes for each comment. Section 5.3 provides responses to each comment in a tabular format.

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5.2. Secretary's Certificate on the DEIR (December 31, 2014, EEA No. 15028)

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The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
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Deval L. Patrick
GOVERNOR

Maeve Vallely Bartlett
SECRETARY

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December 31, 2014

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
DRAFT ENVIRONMENTAL IMPACT REPORT

PROJECT NAME	: South Station Expansion Project
PROJECT MUNICIPALITY	: Boston
PROJECT WATERSHED	: Boston Harbor
EEA NUMBER	: 15028
PROJECT PROPONENT	: Massachusetts Department of Transportation
DATE NOTICED IN MONITOR	: November 5, 2014

As Secretary of Energy and Environmental Affairs, I hereby determine that the Draft Environmental Impact Report (DEIR) submitted on this project **adequately and properly** complies with the Massachusetts Environmental Policy Act (M.G.L. c. 30, ss. 61-62I) and with its implementing regulations (301 CMR 11.00). The Proponent may prepare and submit for review a Final Environmental Impact Report (FEIR) in response to the Scope provided below.

Project Description

As described in the DEIR, the project consists of an expansion of Boston's South Station by the Massachusetts Department of Transportation (MassDOT). The project, referred to as the South Station Expansion project, or SSX, is being undertaken to allow for expansion of intercity and high-speed rail (HSR) service into South Station and to improve existing rail operations and service delivery at South Station provided by the National Railroad Passenger Corporation (Amtrak) and the Massachusetts Bay Transportation Authority (MBTA). MassDOT, the MBTA, the Federal Railroad Administration (FRA) and Amtrak have identified the expansion of rail capacity at South Station as a critical regional and national transportation need. According to MassDOT, this need has been extensively documented in State and regional transportation plans including *Critical Infrastructure Needs on the Northeast Corridor* (2013);*The Northeast*

Corridor Infrastructure Master Plan (2010); *The Amtrak Vision for High-Speed Rail in the Northeast Corridor* (2010); *A Vision for the Northeast Corridor (2012);* MassDOT's *weMove Massachusetts: Planning for Performance* (the Commonwealth's 2040 Long-Range Transportation Plan (2014); MassDOT's *The Way Forward: a 21st Century Transportation Plan* (2013); MassDOT's *Massachusetts State Rail Plan* (2010); MassDOT's *Massachusetts Freight Plan* (2010); the MBTA's *Program for Mass Transportation* (2009); and the Boston Region Metropolitan Planning Organization's (MPO) *Paths to a Sustainable Region*, the long-range transportation plan for the metropolitan Boston region (2011).

To date, MassDOT has received $32.5 million from the FRA and $10 million in additional State funding to complete preliminary engineering and environmental assessment and permitting for the project. No additional sources of federal or State funding have been allocated for final engineering or construction of SSX.

South Station is the sixth busiest station in the national Amtrak system and is the terminus of Amtrak's Northeast Corridor (NEC) service and Lake Shore Limited service from Chicago via Albany; approximately 1.45 million Amtrak passengers used South Station facilities in 2012. From 2003 to 2012, the number of Amtrak passenger arrivals and departures through South Station increased by approximately 52 percent. South Station serves as the terminus for the western and southern lines of the MBTA's commuter rail system. There are nine main line approach tracks that currently converge in the South Station terminal area. Of these nine tracks, five arrive at South Station from the west, consisting of the NEC Main Line, which operate on tracks 1, 2, and 3, and the MBTA's Framingham/Worcester Line, which operates on tracks 5 and 7. The remaining four tracks arrive at South Station from the south, consisting of the MBTA's Fairmount Line, which operates on the Fairmount Line/Dorchester Branch tracks and the MBTA's Old Colony Line, which operates on the Old Colony tracks. Current weekday ridership at South Station includes an average of approximately 4,100 Amtrak combined boardings and alightings, and 42,000 combined MBTA commuter rail boardings and alightings.

South Station also provides connections to the MBTA's Red Line, Silver Line and local bus routes and intra-city bus routes run by private bus companies. Combined South Station boarding and alightings in 2012 include 54,000 on the Red Line, 12,700 on the Silver Line, 2,900 on local bus routes, and 12,200 on intercity/commuter bus routes.

According to the DEIR, the project will provide numerous benefits by supporting improved rail service, improved passenger service, pedestrian and bicycle improvements, improved vehicular circulation, improved multimodal connections, and supporting regional and local economic development. The project will improve operational efficiencies in and out of South Station, upgrade facilities to meet Americans with Disabilities Act (ADA) and life safety regulations, extend platform lengths to meet Amtrak and MBTA future berthing requirements, and enhance multimodal connections through this key transit hub. The project is expected to provide the ability to meet Amtrak's and the MBTA's established objectives of 95 percent on-time performance (OTP) for Acela and commuter rail service, and 90 percent for Amtrak Northeast Regional trains.

Currently, all 13 existing tracks and eight platforms are fully used by Amtrak and the MBTA, and both operators are constrained in their ability to increase service or offer new services due to the size and configuration of the station and terminal facilities. According to the DEIR, the daytime vehicle layover capacity for the MBTA's south side commuter rail service area is presently inadequate and unable to meet projected future demands. Additionally, South Station's passenger facilities, including platforms, waiting areas, and customer support services, do not meet preferred standards for passenger transit facilities. These deficiencies result in congestion and declining service reliability for Amtrak and the MBTA. The project is designed to reduce terminal capacity constraints, replace inadequate station facilities, and remedy problems associated with insufficient layover space.

The project is part of an overall plan to improve intercity and future HSR service in the NEC, as stated in Amtrak's *NEC Master Plan,* its *Vision for High Speed Rail in the Northeast Corridor*, and its 2012 update. By the year 2035, Amtrak projects that daily intercity rail ridership at South Station will increase to approximately 5,500 combined boardings and alightings. South Station commuter rail boarding and alightings are projected to increase to 56,000 daily riders by 2035. Amtrak's 2030 plans call for increased service between Boston and New York City and additional trains to operate over an "inland route" connecting Boston, Worcester, Springfield and New Haven. South Station presently operates with a total of thirteen tracks, all of which are fully utilized by Amtrak and the MBTA resulting in increasing congestion and declining service reliability.[1] Furthermore, there is insufficient vehicle layover space to meet existing and future South Station operational requirements. Amtrak and the MBTA currently store trains in the South Station terminal while waiting for slots at the existing south side layover yards.

The project is expected to improve the rail system's ability to absorb future demand along the MBTA's south side commuter rail lines and along the NEC. In the 2025 opening year, the project would support the projected increase in ridership of approximately 16,000 to 17,000 additional daily combined commuter rail and Amtrak intercity rail boardings and alightings at South Station over the No Build Alternative. By 2035, these numbers would increase to approximately 20,000 to 22,000.

The project includes five primary elements:

- Expansion of the South Station terminal facilities by approximately 400,000 square feet (sf) by adding seven tracks and four new platforms, reconfiguring existing platforms, and constructing larger passenger circulation and waiting areas, amenities, and back of house space. The Tower 1, Broad and Cove Interlockings will be reconfigured to reduce conflicting movements through the terminal area;[2]
- Acquisition and demolition of the U.S. Postal Service (USPS) General Mail Facility located on Dorchester Avenue to provide a 16-acre site upon which to expand South Station and restore Dorchester Avenue for public and station access. As part of the The

[1] South Station currently has less than half the original track capacity that was available when the station was first opened in 1899.

[2] An interlocking is a segment of railroad infrastructure comprised of track, turnouts, and signals linked (interlocked) in a way that allows for trains to move from on track to another, or across tracks, safely by preventing conflicting train movements.

USPS facility acquisition is identified as a state-funded project in the MBTA's current *FY2015-FY2019 Capital Investment Program (CIP)*;

- Creation of an approximately 2,500-foot extension of the Harborwalk along a reopened two-way Dorchester Avenue that will include pedestrian, bicycle, local transit, and vehicular improvements;
- Creation of opportunities for joint/private development adjacent to and/or over an expanded South Station. MassDOT anticipates that revenue from future air rights development could assist in supporting public transportation investments;
- Construction of additional rail layover space to address existing and future Amtrak and MBTA service expansions and other planned improvements. Layover facilities are used to store, service, inspect, and maintain trains when they are not in service.

The approximately 49-acre South Station project site is bounded by Summer Street to the north, Dorchester Avenue and the Fort Point Channel to the east, Atlantic Avenue to the west, and the MBTA's Cabot Yard to the south. The South Station project site also extends along a portion of the NEC Main Line to the west past the Cove Interlocking and along the MBTA's Fairmount/Old Colony Railroad Line to the south just past the Broadway Interlocking. South Station is located at the junction of several Boston neighborhoods including Chinatown, the Leather District, the Fort Point Channel, and the Seaport-Innovation District/South Boston Waterfront.

The project also includes the construction of layover facilities within the City of Boston. After completion of a layover facility alternative analysis that evaluated 28 potential locations, four sites for new and/or expanded layover facilities were further considered as part of the DEIR. These potential layover locations include:

- The Boston Transportation Department (BTD)-owned Tow Lot located along Frontage Road approximately one track-mile from South Station;
- Widett Circle, a 29.4-acre site located approximately one mile south of South Station at 100 Widett Circle and 1 and 2 Foodmart Road, primarily in private ownership;
- Beacon Yard Park, a freight yard and intermodal terminal most recently used by CSX Transportation, Inc. (CSXT) located along Cambridge Street in the Allston section of Boston, approximately four track-miles on the MBTA Framingham/Worcester Line from South Station; and
- Readville Yard 2, an existing MBTA layover yard and maintenance facility located off Wolcott Court in the Hyde Park section of Boston, approximately nine track-miles from South Station.

MEPA Procedural History

The DEIR was noticed in the November 5, 2014 Environmental Monitor. At the request of MassDOT, the review period was extended from the typical 30 days to 49-days. MassDOT held a public hearing on November 18, 2014 to review the DEIR and allow opportunities for questions and comments from the public.

Portions of the project site have previously been subject to MEPA review as far back as 1973. As previously indicated in the Environmental Notification Form (ENF), projects filed on the South Station site include:

- EEA No. 243 – South Station Urban Renewal Project;
- EEA No. 2868 – South Station Project;
- EEA No. 3173 – Temporary South Station Bus Terminal;
- EEA No. 3205 – South Station Project;
- EEA No. 4049 – Tunnel Ventilation Program Phase 1;
- EEA No. 4327 – South Station Wye Connector;
- EEA No. 3205/9131 – South Station Air Rights Project; and
- EEA No. 10270 – North/South Rail Link Project.

Of these prior filings, only three projects required the preparation of an EIR. The South Station Air Rights Project (SSAR) (EEA Nos. 3205 and 9131) consists of a 1.8 million square foot mixed-use development located on the northern end of the site above existing portions of the South Station headhouse and tracks. The project also includes a 70,000-sf horizontally expanded bus terminal, pedestrian connections from the train station concourse and platforms to the expanded bus terminal, and a 775-space three-level parking garage located above the bus terminal. The SSAR includes modifications to existing platform lengths at South Station, reducing platform lengths on Tracks 3-10 between 20 and 89 feet. The EIR complied with M.G.L. Chapter 30 and the Proponent filed a Notice of Project Change (NPC) for an extension of time in 2012.

The North/South Rail Link (NSRL) Project consists of a three-mile tunnel linking North and South Stations and associated rail infrastructure. The DEIR for this project was determined to adequately and properly comply with the MEPA Regulations in July 2003. A Final EIR has not been filed for this project. Given the lapse of time since the filing of the DEIR, this project, if it were to advance, would require reinitiating the MEPA review process with the filing of an ENF.

I have received numerous comments requesting that the scope of the SSX Project improvements include underground rail tracks and platforms for the NSRL Project. In the DEIR, MassDOT responded to similar requests that it is not currently in a financial position to endorse or advance the design of the extensive underground infrastructure associated with the NSRL. Furthermore, MassDOT stated that due to change in the physical nature of the corridor since the construction of the Central Artery Project, as well as new assumptions regarding staging, construction and costs since the last formal assessment of the NSRL, it believes that many of the goals of the NSRL project can be accomplished through more incremental efforts, such as the expansion of South Station. I acknowledge that a key benefit of the NSRL project that will not be realized by the SSX project currently under review is a seamless connection between South Station and North Station. This connection would provide enhanced service along the MBTA commuter rail, subway, and NEC lines and would facilitate operations and maintenance by eliminating the need to run non-revenue trains to reach more distant layover facility locations. MassDOT reiterated in the DEIR that the SSX project will be advanced in such a way that it will

not preclude the potential for future underground infrastructure, such as tunnel portals and station locations.

Jurisdiction and Permitting

This project is subject to MEPA review and requires the preparation of a mandatory EIR because it requires State Agency Actions and exceeds several MEPA review thresholds including:

- Expansion of an existing non-water-dependent structure, provided the use or structure occupies one or more acres of (historic) tidelands (301 CMR 11.03(3)(a)(5));
- New discharge or expansion in discharge to a sewer system of 100,000 or more GPD (301 CMR 11.03(5)(b)(4(a));
- Generation of 3,000 or more unadjusted new additional daily trips on roadways providing access to a single location (301 CMR 11.03(6)(a)(6)); and
- Construction of 1,000 or more new parking spaces at a single location (301 CMR 11.03(6)(a)(7)).

The project requires a c.91 Waterways License and may require a Section 401 Water Quality Certification (401 WQC) from the Massachusetts Department of Environmental Protection (MassDEP), a Vehicular Access Permit from MassDOT, and air-rights easements or approvals from the MBTA.[3] The project also requires an Amendment to the Fort Point Channel Downtown Waterfront Municipal Harbor Plan (MHP) and a Public Benefit Determination issued by the Executive Office of Energy and Environmental Affairs (EEA). The project may also require a MassDEP Dewatering General Permit for dewatering of non-contaminated groundwater and a MassDEP Remediation General Permit for dewatering of contaminated groundwater. The project may require an 8(m) Permit, Construction Site Dewatering Discharge Permit and/or a Sewer Use Discharge Permit from the Massachusetts Water Resources Authority (MWRA).

The project is subject to State Register Review (950 CMR 71.00) and Section 106 Review (36 CFR 800) by the Massachusetts Historical Commission (MHC). A Federal Consistency Certification from the Massachusetts Office of Coastal Zone Management (CZM) will also be required.

An Order of Conditions will be required from the Boston Conservation Commission, or in the case of an appeal, a Superseding Order of Conditions from MassDEP. The project will also require a Drainage Discharge Permit and may require a Dewatering Discharge Permit from the Boston Water and Sewer Commission (BWSC). Construction of the public/private development areas above South Station will require review by the Boston Redevelopment Authority (BRA).

The project requires several federal permits/approvals including, but not limited to: approval under the National Environmental Policy Act (NEPA), Part 77 Airspace Review from the Federal Aviation Administration (FAA), Modification of High Occupancy Vehicle

[3] Since the filing of the ENF, the MassDEP Sewer Regulations (314 CMR 7.00) have been amended. The project is no longer anticipated to require a MassDEP Sewer Connection Permit (BRP WP 74). Wastewater permitting will be undertaken by the Boston Water and Sewer Commission.

Designation review by the Federal Highway Administration (FHWA), Section 4(f) Review by the United States Department of Transportation (USDOT) and a National Pollutant Discharge Elimination System (NPDES) Construction General Permit from the United States Environmental Protection Agency (EPA). The project may require a NPDES Permit, a Notice of Intent, or a NPDES Permit Exclusion associated with construction period dewatering. The project is subject to the MEPA Greenhouse Gas (GHG) Emissions Policy and Protocol.

The project will receive Financial Assistance in the form of funding from the Commonwealth and the Federal Railroad Administration (FRA). Therefore, MEPA jurisdiction is broad in scope and extends to all aspects of the project that may cause Damage to the Environment, as defined in the MEPA regulations.

Project Changes Since the ENF

The DEIR presented modified project alternatives to those outlined in the ENF. These modifications were generally attributable to advancement in project design and environmental assessments. These updated project alternatives are described in detail later in this Certificate.

Since the ENF, MassDOT concluded that the Beacon Park Yard (BPY) layover site is the preferred location to the west of south station to meet existing and future MBTA commuter rail layover needs. This facility is proposed to provide storage for up to 20 eight-car trainsets in a parallel track arrangement and support facilities for MBTA operations. The BPY site is located within the study area of a separate MassDOT project, the Interstate 90 (I-90) Allston Interchange (EEA No. 15278). This project proposes myriad transportation and multi-modal improvements within Boston's Allston neighborhood and is intended to support redevelopment of land formerly owned by CSX and now under the control of Harvard University. In order to facilitate an evaluation of the cumulative environmental impacts associated with the proposed layover facility operations at BPY in conjunction with other elements of the I-90 Allston Interchange Project, I incorporated the assessment of environmental impacts from the BPY layover yard into the scope for a DEIR outlined in the Certificate on the ENF issued on December 24, 2014 for the I-90 project. However, as detailed later in this Certificate, the operational impacts of rail layover facilities located at BPY in relation to the future operations at South Station will continue to be addressed in conjunction with the South Station Expansion (SSX) project.

Review of the DEIR

Project Description and Permitting

The DEIR included a description of the proposed project elements and related potential environmental impacts. The DEIR included updated site plans depicting existing and post-development conditions for each project alternative. The existing conditions analysis highlighted operational constraints due to station design (e.g., no mid-platform boarding, substandard platform widths and lengths) and layover facility locations. Furthermore, the DEIR described how the proposed changes to the South Station headhouse and platforms will be integrated into

the existing South Station building and platforms, including connections to other modes of transit (e.g., private and MBTA buses, Red Line and Silver Line) and Main Line commuter rail operations. The DEIR included a table that identified anticipated permits from State, local and Federal entities for both the South Station site and the proposed layover sites. Draft Section 61 Findings for use by State Agencies in the permitting process were also included in the DEIR.

Project Purpose and Need

The DEIR included an extensive discussion of the project's purpose and need, with supporting ridership data and an evaluation of existing infrastructure deficiencies. The DEIR generally used an approximate opening year of 2025 and a horizon year of 2035 for the analyses performed in conjunction with the evaluation of potential project-related impacts.

According to the DEIR, terminal capacity constraints are attributable to the limited number of platform tracks and the configuration(s) of the track infrastructure (one main track and multiple approach interlockings). Because South Station is a terminal facility, every arriving train must be reversed to either leave the station for a new revenue trip, or to access a layover facility, further limiting station capacity. Furthermore, the configuration of the interlockings near South Station create additional challenges for train movements in and out of the terminal. These constraints were described as follows in the DEIR:

- **Tower 1 Interlocking** - South Station's main interlocking, Tower 1 is located immediately south of the terminal at the northern end of all Amtrak and MBTA lines that come into South Station from the west and south and consists of nine main line approach tracks converging into 13 station tracks and eight platforms. All moves for berthing trains entering or exiting South Station occur at Tower 1 Interlocking. In its current configuration, Tower 1 Interlocking contains two long ladder tracks, tracks that link a series of parallel tracks, which allow a train approaching South Station on any track to reach nearly every platform track. While this layout provides operational flexibility, it creates a bottleneck for Amtrak and MBTA operations by limiting the number of trains that can simultaneously move through the interlocking, resulting in service delays.

- **Cove and Broad Interlockings** – Located south and west of Tower 1 Interlocking are two additional approach (or "setup") interlockings. Cove Interlocking is located approximately 0.5 miles from South Station on the NEC and MBTA's Framingham/Worcester Line and serves as a universal interlocking for four of the five tracks approaching South Station. Cove Interlocking does not provide access to all tracks entering South Station. This interlocking allows trains to access the MBTA and Amtrak maintenance facilities via the Wye track. Broad Interlocking, located adjacent to the MBTA's South Side S&I facility, provides limited access between the MBTA Fairmount and Old Colony Railroad main line tracks and does not allow universal access to all tracks in both directions. This interlocking also allows trains to access the South Side S&I facility and to and from Cove Interlocking via the Wye track. The limitations of these two interlockings restrict "setup" train moves for appropriate tracks entering the station that could take place outside of the South Station terminal area, forcing them to take place within the Tower 1 Interlocking. According to the DEIR, this lack of

operational flexibility increases the number of conflicting movements within the already constrained Tower 1 Interlocking, exacerbating congestion, inefficiencies, and delays for trains and passengers.

Finally, the configuration of the Tower 1, Cove and Broad Interlockings also require many diverging moves in and out of the station to be made at Tower 1 Interlocking, at a speed of 10 miles per hour (mph), rather than the Cove or Broad Interlockings, which can be performed at speeds of 30 mph.

The DEIR emphasized the importance of improving service reliability, measured by OTP, at South Station. As noted by MassDOT, the interconnectedness and complexity of service at South Station results in individual train delays not only directly impacting overall station operations, but a cascading effect upon service line operations. Data presented in the DEIR indicate that both Amtrak NEC and MBTA commuter rail service have not met respective OTPs from 2008 to 2012.

Future (2035 No-Build) ridership growth on Amtrak and the MBTA commuter rail system are projected to increase operations at South Station for both revenue and non-revenue trips. Current weekday operations at South Station include 40 Amtrak and 280 MBTA revenue trips and 32 Amtrak and 97 MBTA non-revenue trips, for a total of 449 daily train movements at South Station terminal. By 2035, weekday operations at South Station are estimated to include 80 Amtrak and 315 MBTA revenue trips and 58 Amtrak and 101 non-revenue trips, for a total of 554 daily train movements at South Station terminal, an increase of 23 percent. To accommodate the 2035 operating plan, MassDOT performed simulation tests to determine the appropriate number of station tracks at South Station. These tests concluded that 20 total station tracks (an expansion of 7 tracks) would provide the optimal size to allow train volumes to pass through the Tower 1 Interlocking.

Expansion of South Station, along with implementation of other rail improvement projects, is expected to increase demand of vehicle layover facilities. The DEIR provided a clear analysis identifying the current vehicle layover space deficiencies, and described the additional demand associated with the SSX project. Current MBTA service levels require daytime layover space for 28 trainsets (locomotives and coaches); space exists for only 22 trainsets within dedicated layover facilities. This results in the storage of six non-revenue trains at South Station platforms while waiting for available slots at existing south side layover locations. Storage of trains on the platforms increases congestion at the terminal and creates operational conflicts.

According to the DEIR, Amtrak's current peak layover capacity for South Station service is eight trainsets during the day and 13 trainsets overnight. All of Amtrak's existing layover needs are accommodated at the Southhampton Street Yard. Amtrak's Front Yard is not used by Amtrak for layover functions, but is used for MBTA layover and Amtrak non-revenue trains, rail-bound equipment storage, and Amtrak maintenance-of-way material storage needs.

Layover space is needed to accommodate future MBTA service increases, fleet expansion and transition to longer trainsets (eight-car). Additionally, Amtrak will need to expand within its existing facilities to accommodate layover needs associated with its future service projections

(20 overnight trainset layover spots). While Amtrak has not identified the location of future layover needs, it indicated that it does not foresee a need for additional capacity beyond the use of its current system-wide Amtrak-owned facilities. The MBTA projects that by 2040 it will have the capacity to store only 28 of the 49 trainset spaces needed.[4]

As noted in the DEIR, the location of layover facilities is one of the main factors that determine the required diverging moves within Tower 1, Broad and Cove Interlockings. Currently, all layover facilities are located south of South Station, despite 60 percent of all revenue trains approaching South Station from the western routes. With the addition of Amtrak revenue trains, approximately 70 percent of trains approach from western routes. Exclusively southerly-located layover facilities contribute to the capacity constraints at South Station. While trains accessing layover facilities are non-revenue trains, they are still required to be dispatched carefully, and must pass through the Tower 1 Interlocking just like revenue trains. MassDOT noted the challenges of balancing competing revenue and non-revenue train movements to maximize operational performance near South Station. Given these constraints, MassDOT determined that rail layover facilities should be provided both west and south of South Station, with such split layover facilities improving operations and reducing conflicting movements by keeping trains on one side of the terminal or the other.

Finally, the DEIR discussed the need to improve substandard facilities at South Station. MassDOT has established an overall level of service (LOS) goal of LOS C for the South Station public circulation areas and LOS D for the station platforms in conjunction with the project. The current size and configuration of South Station headhouse facilities do not adequately support current and future passenger service needs. According to the DEIR, the existing headhouse and platforms result in a poor passenger experience (LOS E or F) and the concourse configuration results in confusion and inadequate connections between intercity rail, commuter rail, bus, and transit service.[5] Furthermore, the station platforms do not comply with modern design standards, including MassDOT's current standard island platform requirements. Presently, Track 1, 2, and 12 can hold a maximum of seven-car MBTA trainsets and Track 13 can only accommodate a six-car MBTA trainset. Train length for Amtrak's Acela service is 664 feet and 748 for Amtrak regional trainsets. The MBTA and Amtrak have identified future berthing requirements associated with longer trainsets at 850 feet and 1,050 feet, respectively. Current platform LOS is adequate (LOS D) with the occupant load of one MBTA commuter rail bi-level coach consisting of an eight-car trainset, but services sharply decline when concurrent train arrivals occur on the same platform. The proposed project design includes platform and passenger waiting area improvements to meet MassDOT's LOS goals and provides a facility that remains a viable and attractive alternative to air and automobile travel.

Public Involvement and Agency Outreach Efforts

The DEIR summarized MassDOT's public involvement and Agency coordination efforts associated with the South Station design and MEPA review process. MassDOT has and will continue to use a variety of techniques to facilitate public engagement. These techniques include:

[4] This analysis assumed that by 2025, the MBTA would be using a four-track layover yard on an MBTA easement at Beacon Park Yard for layover of 12 trainsets. This analysis also assumed reduced capacity by six trainsets at Southampton Yard and Front Yard due to the proposed expansion of the MBTA's fleet to eight-car trainsets.

[5] Levels of Service (LOS) for pedestrian flow and queuing range from LOS A (no crowding) to LOS F (extreme crowding).

- Project Mailing List – MassDOT maintains a database of individuals and organizations and sends regular email updates, including the availability to review documents and public meeting dates;
- Social Media – MassDOT provides project-related updates through the MassDOT blog, Twitter, and Facebook pages;
- Meetings and Events – MassDOT hosts public informational meeting to share milestone information and collect comments and suggestions. These meetings have been held with a variety of community, civic, business, and citizen groups potentially affected by the project;
- Online survey – MassDOT opened an online survey in fall of 2013, available in English, Spanish and Chinese, to gather feedback on current and future amenities at South Station. MassDOT will consider the findings of the survey as the project design progresses; and
- Other Project Materials – MassDOT maintains a project website, creates project fact sheets and project snapshots for a non-technical audience, and created a project brochure available in English, Spanish, and Chinese.

Finally, while this project is not subject to the EEA Environmental Justice (EJ) Policy, MassDOT committed to evaluate the project for potential impacts to EJ communities based on federal and State guidelines. The DEIR included an EJ and Title VI Technical Report (EJ Report) prepared in accordance with the ENF and DEIR Certificates and the FRA's *Procedures for Considering Environmental Impacts* (1999). The EJ Report was prepared to demonstrate that MassDOT and the SSX project are in compliance with Title VI of the Civil Rights Act of 1964 and EEA's *Environmental Justice Policy*. The EJ Report described the study's methodology, existing conditions within the study area (both South Station and each potential layover site) with regard to minority, low income, or limited English proficiency populations, and potential project-related impacts to these identified EJ populations. Potential types of impacts assessed included:

- Changes in accessibility and mobility for EJ and disabled populations, compared to changes for non-disadvantaged populations;
- Direct impacts due to relocations and other indirect property impacts; and
- Indirect impacts due to air quality and noise impacts.

The DEIR identified the following conclusions from the EJ Report:

- The proposed transportation improvements will improve station accessibility and mobility for all users, including EJ and Title VI populations;
- The project will not result in disproportionate impacts to EJ and Title VI populations and will not directly displace these populations; no residences will be displaced by the project; and
- The displacement of the USPS facility could affect some EJ and Title VI populations due to facility relocation efforts. However, this facility is anticipated to be relocated within the area. Similarly, the displacement of 30 businesses at the Widett Circle layover facility could affect EJ populations. The EJ Report noted that it is anticipated

that businesses would be relocated in the Boston Area and would not result in the long-term loss of employment.

The EJ Report also included the results of Central Transportation Planning Staff (CTPS) travel demand modeling used to asses any changes to accessibility to needed services or employment for EJ populations. This analysis indicated that the SSX project will result in minimal or no changes for the communities of concern in any of the project alternatives. Finally, permanent changes in the No Build and Build Alternatives are expected to be negligible (either no change or changes of less than two percent) between both EJ and disabled populations and non-disadvantaged populations. The EJ Report concluded that impacts in the No Build and Build conditions will not be disproportionate or adverse on EJ communities or populations.

Alternatives Analysis

As noted previously, since the ENF MassDOT has continued to refine the project alternatives subsequent to additional evaluation of track configuration and platform alternatives, station concept design, layover facility concepts, and joint/private development alternatives.

The DEIR presented the results of an initial (Tier 1) screening of track configuration alternatives for South Station. The Tier 1 screening evaluated a series of "unconstrained" and "constrained" rail alternatives to develop potential track configurations. Unconstrained alternatives included those that were not limited by existing site boundaries and included opportunities located outside the original project study area. MassDOT determined that while these alternatives could accommodate Amtrak and MBTA service expansions, they resulted in unacceptable challenges associated with land acquisition, construction phasing, and separated passenger rail services. These alternatives were dismissed from further consideration.

Constrained alternatives focused on minimizing impacts to existing infrastructure, including SSAR infrastructure, while remaining within the project study area and improving terminal operations. MassDOT developed four alternatives with various layouts at the terminal and Tower 1 Interlocking to optimize operational flexibility, minimize disruption to existing operations, and/or maximize future joint development on-site. Each of these alternatives was subjected to a set of evaluation criteria: platform accessibility, infrastructure maintenance, constructability, and capital cost. The DEIR included tables identifying platform accessibility and the location of proposed crossover moves (i.e., Cove, Tower 1, or Broad) by service line (e.g., NEC, Old Colony, etc.) for each Constrained Alternative.

The DEIR also assessed platform length consistency for each Constrained Rail Alternative (CRA) with the established future platform length requirements by the MBTA (850 feet) and Amtrak (1,050 feet). This assessment included the projected track length reductions associated with the SSAR project. The DEIR described potential innovations MassDOT may incorporate into the project to maximize platform length given the constrained area. These include:

- Locating the locomotive and a portion of the first coach outside the platform, without the ability to board/alight at both ends of the coach. This approach

reduces platform berthing requirements by 135 feet, reducing the effective platform length to accommodate Amtrak trainsets to 915 feet and MBTA trainsets to 715 feet;

- Using a fixed type bumping post in lieu of the longer bumping posts currently in use at South Station;
- Terminating the overhead contact system (OCS) within the station area and using existing station structures (e.g., canopies, beams, columns) to support the OCS instead of using OCS tie-off poles.

The DEIR identified the amount of Tower 1 Interlocking trackwork requirements for each CRA, noting that less trackwork would result in less ongoing maintenance cost. Constructability of each CRA was assessed by evaluating the potential impact constructing the project would have on maintaining ongoing operations at South Station. Some alternatives would require completely shutting down South Station operations, requiring substitute transportation and busing for period of up to two to three years. Finally, order-of-magnitude capital costs for each CRA were determined, considering costs associated with all tracks, signal system, OCS, communication system, and associated civil work within the terminal and station areas, and the interlocking. These order-of-magnitude costs range from $138 million (CRA 3) to $493 million (CRA 1).

Based on the results of this assessment, two of these alternatives, CRAs 2 and 3, will be advanced to a Tier 2 screening process. Both of these alternatives support a 20-track South Station layout with up to eight trains moving through Tower 1 Interlocking simultaneously, increase terminal capacity by approximately 55 percent, create new 22-foot wide platforms that meet current ADA and National Fire Protection Association (NFPA) standards, establish direct access to the bus terminal and other modes of transit at South Station, and avoid impacts to the existing South Station Bus Terminal and future bus expansion elements of the SSAR project.

Constrained Rail Alternative 2 (CRA2) would streamline operations at South Station by redesigning the Tower 1 Interlocking to reduce the number of conflicting movements through the interlocking. NEC and Worcester/Framingham routes would access the westerly station tracks and the Fairmount and Old Colony routes would access the easterly station tracks. CRA 2 would also allow access to the MBTA's South Side Service and Inspection (S&I) facility for 18 of the terminal tracks. Tower 1 Interlocking would require extensive reconfiguration. While work could be staged to avoid completely shutting down South Station service during construction, it would likely result in substantial impacts to South Station operations during the construction period.

Constrained Rail Alternative 3 (CRA3) would include the construction of additional terminal tracks by adding special trackwork to the existing Tower 1 Interlocking, minimizing disruptions during the construction period. CRA 3 would maximize platform accessibility by facilitating universal platform accessibility for trains approaching on the Fairmount and Old Colony. Trains traveling on the Framingham/Worcester and NEC routes would have varying access to platforms contingent upon whether crossover moves were made at Tower 1 or Cove Interlockings (Tracks 1-14). CRA 3 would allow access the S&I facility for all tracks.

CRA 2 and CRA 3 include improvements to Cove and Broad Interlockings. These improvements include the installation of new crossovers, track realignment, and installation of a third running track at Broad Interlocking. These improvements will move conflicting train movements to areas outside the terminal that accommodate higher speeds and improve operations at the Tower 1 Interlocking while maintaining the flexibility of train movements within South Station. Additionally, these layout improvements would continue to provide the operational flexibility necessary in the event of an emergency or equipment failure.

The DEIR noted that station, track and layover facility designs will not preclude the placement of infrastructure associated with any future rail electrification that may be undertaken by MassDOT, nor preclude the potential use of diesel multiple units (DMU) if and when they may be incorporated into the MBTA future fleet. Furthermore, the DEIR stated that the project does not include any upgrades for freight traffic, but does not preclude Track 61 from being used for freight service to the Port of Boston in the future. I do note, however, that the introduction of potential future routes, such as those mentioned in some comment letters (e.g., DMU connections from Back Bay to the Boston Convention and Exhibition Center) present their own operational challenges, as they require crossing the NEC. If these projects are designed, funded, and advanced, MassDOT will be required to consider their potential impact on the operational improvements gained through the SSX project itself. However, this analysis is beyond the scope of the SSX project currently under review.

The DEIR also described the results of an initial screening analysis undertaken for the conceptual design of South Station. Similar to the track configurations, this initial evaluation considered both "unconstrained" and "constrained" alternatives. According to the DEIR, initial unconstrained alternatives included expanding the South Station footprint to include the USPS facility site, 245 Summer Street and relocating or altering the SSAR project. MassDOT opted to eliminate concepts that required the acquisition of 245 Summer Street or substantial alteration of the SSAR project to allow for advancement of design alternatives that are more financially feasible and readily constructible. The DEIR outlined a series of design principles for the expansion of the South Station headhouse. These design principles are intended to guide a design responsive to good planning and urban design, station architecture, access and connectivity, and historic preservation.

The DEIR included an expanded alternatives analysis that contained conceptual site layout plans, a summary of potential environmental impacts, and a supporting narrative for each of the following alternatives for the South Station Site:

- A No Build Alternative;
- Alternative 1 – Transportation Improvements Only;
- Alternative 2 – Joint/Private Development Minimum Build; and
- Alternative 3 – Joint/Private Development Maximum Build.

MassDOT has not identified a Preferred Alternative amongst the build alternatives. MassDOT will select a Preferred Alternative prior to submission of the FEIR.

No Build Alternative

The No Build Alternative consists of the following:

- Completion of the SSAR project, including associated expansion of the bus terminal and parking garage and modifications to the platforms and headhouse in the northern portion of the South Station rail terminal.
- South Station would remain in its current configuration with 13 tracks and 8 platforms, with terminal operations, including the Tower 1, Broad and Cove Interlockings configurations remaining unchanged. Activities conducted as part of the MBTA's State of Good Repair (SGP) program would be completed;
- The USPS General Mail Facility would not be relocated and the majority of Dorchester Avenue would remain unavailable for public use;
- Current roadway configurations surrounding South Station would remain unchanged (e.g., Atlantic Avenue, etc.);
- There would be no extension of the Harborwalk along the Fort Point Channel adjacent to the USPS facility;
- There would be no implementation of bicycle and pedestrian accommodations through and around the site; and
- There would be no expansion of joint/private development.

Alternative 1 – Transportation Improvements Only

Alternative 1 includes the expansion of South Station onto the 14-acre USPS facility site, only, with no additional provisions for joint/private air rights development. The South Station terminal would be expanded by 400,000 sf, to a total of 610,000 sf consisting of passenger platform areas and concourse levels with passenger support services, including amenities such as food and beverage sales. Capacity improvements would include the construction of seven new tracks and four new platforms for a total of 20 tracks and 11 platforms. Additionally, several existing tracks and platforms and the Tower 1, Cove and Broad Interlockings would be reconfigured. This Alternative would accommodate the previously approved air rights and station modifications associated with the SSAR project. This alternative also includes the reopening of Dorchester Avenue for public and station access, a 2,500-foot extension of the Harborwalks along Dorchester Avenue, and improved pedestrian and bicycle connections. An existing MBTA/BRA easement (presently utilized as a patio for 245 Summer Street) would be required to reopen Dorchester Avenue as a two-way street.

Alternative 1 also includes the implementation of a series of transit improvements projects expected to be in place by 2035 as indicated in the Boston area's Regional Transportation Plan (RTP). These projects include, but are not limited to:

- South Coast Rail commuter rail service;
- Green Line Extension to Tufts University and Union Square;
- Increased frequencies on the Fairmount Line with four new stations;
- The Silver Line Gateway Project; and
- Increased service on Amtrak intercity trains.

Alternative 2 – Joint/Private Development Minimum Build

Alternative 2 includes all of the transportation improvements provided in Alternative 1 with provisions to support future development through incorporation of appropriate structural foundations into the overall station and track design. Since a specific building program or development partner has not been established for air rights development, MassDOT, as directed by the MEPA office, evaluated the potential environmental impacts associated with a future project that would comply with existing State and local regulations, including existing building height and setback from the Fort Point Channel requirements in the c.91 regulations, the Fort Point Downtown Municipal Harbor Planning Area requirements, and the Massachusetts CZM program. This alternative consists of 660,000 sf of mixed uses including residential (220,600 sf), office (255,500 sf), retail (79,300 sf) and hotel (104,600sf) space located in six buildings ranging up to 12 stories (142 feet) in height. Approximately 234 parking spaces would be provided in structured underground parking.

Alternative 3 – Joint/Private Development Maximum Build

Alternative 3 includes all of the transportation improvements provided in Alternative 1 with provisions to support future development through incorporation of appropriate structural foundations into the overall station and track design. Alternative 3 would also include a joint/private development program unencumbered by the height and setback requirements included in Alternative 2, but would instead only be limited by the FAA's maximum height limit of 290 feet associated with Boston's Logan Airport. This alternative would require an amendment to the Municipal Harbor Plan (MHP), which would modify applicable c.91 regulations for this site. Alternative 3 consists of approximately 2,000,000 sf of mixed uses including residential (774,700 sf), office (917,300 sf), retail (75,620 sf) and hotel (266,600 sf) space in six buildings ranging up to 21 stories (not exceeding 290 feet). Approximately 506 parking spaces would be provided in structured underground parking.

Joint/private development alternatives were based on station requirements, engineering considerations, urban design criteria and financial feasibility. Concepts developed for the track configuration, station design, and layover facility sites are the same in each Build Alternative. Therefore, differences between alternatives presented in the DEIR are limited to those associated with Alternatives 2 and 3. According to the DEIR, MassDOT is conducting an in-depth financial feasibility analysis of joint/private development alternatives to determine financial viability, including potential revenues associated with leasing the air rights to a developer. The results of this analysis should inform the selection of a Preferred Alternative to be presented in the FEIR.

Layover Sites

The DEIR presented the results of a Tier 3 layover site screening analysis, building upon data prepared for the ENF and direction provided in the scope for the DEIR. MassDOT has determined that no single site can provide the physical and operational requirements to fully meet South Station's layover needs. The Tier 3 analysis included evaluation of various layover facility combinations to determine their ability to best meet system-wide layover needs, including expanded service at South Station and use of the four existing layover locations.

Established screening criteria included: ability to meet layover capacity and program needs, railroad operations requirements, and order-of-magnitude cost estimates. The FEIR will present a Preferred Alternative regarding layover facilities, assumed to include BPY and some combination of Widett Circle and/or Readville Yard 2.

Layover No Build Alternative

The DEIR described layover facility conditions associated with a No Build Alternative. In the No Build Alternative, Amtrak and the MBTA would continue to use Amtrak's Southampton Street Yard and the MBTA's Readville Yard 2 and S&I facilities as midday layover sites to support South Station operations. According to the DEIR, due to the planned expansion of the MBTA's fleet to all 8-car trainsets by 2035 (current trainsets vary from 5 to 8 cars) the MBTA would experience reduced layover capacity at Southampton Yard. Amtrak's Front Yard, currently used by the MBTA for midday layover for trainsets with six cars or less, would no longer be available for midday storage. Therefore, in this alternative, the MBTA would increasingly be required to store non-revenue trains at South Station platforms, outlying facilities, or by moving them around within the MBTA system while waiting for slots at the south side layover facilities. Widett Circle would remain in private ownership and no changes would be implemented at BPY.

BTD Tow Lot Layover

The approximately 11-acre BTD Tow Lot is primarily owned by the City of Boston and located approximately one track mile from South Station. It is currently used for the storage of impounded vehicles and by the City of Boston Department of Public Works (DPW). Use of this site would require an easement from Amtrak and displacement of existing on-site City of Boston uses. According to the DEIR, the City of Boston identified a series of requirements for the relocation of BTD uses (e.g., greater than 20 acres, located in City of Boston, etc.). Projected impacts to DPW functions (i.e., fueling facility, salt pile, single-story garages and ramps) would require either major modifications or relocation of the DPW facility. MassDOT determined that there were no sites available that meet the City's criteria for a suitable relocation for BTD and DPW facilities. MassDOT concluded that acquisition of the BTD Tow Lot is impractical and eliminated it from further consideration. I note that recent reports indicate that this site has been identified as a potential location for a future soccer stadium or a venue associated with Boston's 2024 Summer Olympics Bid.

Readville Yard 2 Layover

Readville Yard 2 is an approximately 17.4-acre site located in the Readville section of the Hyde Park neighborhood. It is located at the intersection of the NEC and the MBTA's Fairmount Line, approximately 8.8 track miles south of South Station. This facility, owned by the MBTA, currently houses a maintenance repair facility and is the largest layover yard used by the MBTA for south side service, with a total of 12 tracks. Ten of the tracks are used for storage and two are used for switching and movement of trains. The site also contains a building with three tracks for maintenance functions.

The Tier 3 analysis indicated that Readville Yard 2 could be expanded to provide storage for an additional eight, eight-car trainsets, for a total layover capacity of 18 eight-car trainsets. Support facilities would be expanded by 11,700 sf to provide additional crew space, a support shed, and construction of a power substation. The proposed layover expansion would increase the facility by approximately seven acres. While the MBTA currently owns the majority of this area, a partial taking of approximately 0.7 acres of an adjacent privately-owned property, owned by James Grant Company, would be required.

Beacon Park Yard Layover

The BPY site is MassDOT's preferred location for a westerly located layover facility. BPY is an approximately 30 acre site located in Allston along the MBTA's Worcester/Framingham Line approximately 3.8 track miles west of South Station. Historically, this site has been used as a freight yard and intermodal terminal in Boston for CSXT, which recently relocated to central Massachusetts. BPY is currently owned by Harvard University and remains encumbered by CSXT's operating rights. According to MassDOT, an agreement in principal has been reached with Harvard University to use approximately 22 acres of BPY for a new commuter rail layover, maintenance facility and rail station.

The Tier 3 analysis indicated that BPY could provide layover space for up to 20 eight-car trainsets with 31,400-sf of support facilities consisting of a crew building, support shed, and power substation.[6] As noted previously, the potential environmental impacts associated with these proposed uses will be reviewed in conjunction with MassDOT's I-90 Allston Interchange project (EEA # 15278).

Widett Circle Layover

The Widett Circle layover facility site is located approximately one mile south of South Station. As noted in the DEIR, this site is comprised of two parcels: Cold Storage and Widett Circle. The Cold Storage parcel, located at 100 Widett Circle, is approximately 6.6 acres in area and currently houses a privately owned temperature controlled food storage and distribution facility. The building has an active rail siding served by CSX Transportation, Inc., (CSXT) with space for six freight cars. The DEIR acknowledged that a change in ownership of this site is anticipated, as plans are being advanced to convert the existing cold storage facility into a construction material recycling facility (EEA # 15070) by Celtic Recycling, LLC. Widett Circle, located at 1 and 2 Foodmart Road, is owned by the New Boston Food Market Development Corporation and is comprised of approximately 30 units leased to food processing, food storage, and food logistics businesses. I note the City of Boston's comment letter identifying Widett Circle as being located adjacent to the Dorchester Avenue corridor from Broadway to Andrew Stations as a "strategic planning area" where the City will be focusing efforts to identify a long term growth and economic plan.

The Tier 3 analysis indicated that Widett Circle could provide layover space for up to 30 eight-car trainsets and a 44,000-sf support facility including a crew building, support shed, and

[6] I note that the ENF for the I-90 Allston Interchange Project (EEA No. 15278) identified additional potential uses at this facility beyond those mentioned in the DEIR, including maintenance operations such as wheel truing and car washing.

power substation. Construction of a layover facility at this location will require the acquisition of 29.4-acres of private property, relocation of existing on-site businesses and demolition of buildings.

Land Impacts

The South Station and proposed layover facility sites are all characterized by existing urban and industrial land uses. Since these are predominantly altered areas, direct land impacts are anticipated to be limited.

The DEIR included an analysis of existing land uses and zoning at the South Station and layover facility sites. All development alternatives at South Station will require the demolition of the USPS General Mail Facility. The relocation of this facility, if pursued by the USPS, may be subject to separate MEPA review contingent upon the characteristics and location of a new facility. The South Station site is regulated by a number of City of Boston zoning and overlay districts, including but not limited to, the Flood Hazard Overlay District, the Greenway Overlay District, and the South Station Economic Development Area (EDA). The DEIR discussed project consistency with relevant planning documents applicable to the South Station site including the *Fort Point Channel Watersheet Activation Plan,* the *Fort Point District 100 Acres Master Plan,* the *South Bay Planning Study*, and the *Chinatown Master Plan.* The DEIR noted the ongoing master planning process underway by the City of Boston for the South Station/USPS area. MassDOT will coordinate with the City of Boston to ensure that the conceptual joint/private development plans will be consistent with the City's master plan and its recommendations for amendments to and refinements of current zoning.

The proposed layover facilities are located in industrially-zoned areas and are generally consistent with current zoning. The northernmost portion of the Readville Yard 2 site is located in the Neponset River Riverfront Protection Overlay District and the southern boundary is proximate to a single-family residential district. MassDOT will design this facility consistent with the zoning requirements and applicable setbacks and screening requirements.

The DEIR described how the proposed layover facilities may impact existing on-site uses. Two of the proposed layover facilities will require the acquisition of private property; Widett Circle and Readville Yard 2 and displacement of existing businesses at Widett Circle. The DEIR noted that for the construction and/or expansion of the layover facilities, required property acquisitions will be limited to the minimum footprints required to support each function, including access roads, stormwater management facilities, and employee parking area, where required.

The DEIR included a listing of known development projects (either in planning, permitting, construction phases) near the South Station and layover facility sites. The DEIR described the type and size of each project, its location, and status of review according to the BRA's Article 80 database. This summary highlights the growth trends in and around the South Station site, particularly along in the Seaport/Innovation District.

There are no designated Article 97 lands within the project area. Open space within the South Station site includes Rolling Bridge Park, a park of local significance per Section 4(f) and will be assessed as part of the project's federal review process. An existing MBTA/BRA easement (presently include the patio for 245 Summer Street) will be required in order to reopen Dorchester Avenue as a public two-way street.

Wetlands, Waterways and Tidelands

The DEIR identified the general location of wetland resource areas regulated under the Massachusetts Wetlands Protection Act (WPA) on the South Station and layover facility sites. The DEIR summarized potential wetland resource area impacts associated with the SSX project.

- South Station: wetland resource impacts include approximately 346,900 sf (7.9 acres) of 100-foot jurisdictional buffer to coastal bank and approximately 129,200 sf (2.9 acres) of land subject to coastal storm flowage (LSCSF) (100-year floodplain). The project site also contains Coastal Bank and Land Under Ocean (LUO) associated with Fort Point Channel. These resources are beneath the bridges and will not be impacted. Coastal bank is also defined by the Fort Point Channel seawall along Dorchester Avenue. Modifications to the seawall involving excavation or reconstruction are not anticipated but minor repairs to address mortar voids and shifted granite blocks may be conducted. The minor repairs would be considered maintenance activities with no impacts to resource areas of bank, land under the ocean, or land subject to tidal action.
- Widett Circle: No impacts to WPA jurisdictional resource areas are anticipated at this location;
- Readville Yard 2: wetland resource impacts include approximately 2,100 sf (0.05 acres) of Riverfront Area. The project will also impact approximately 14,200 sf (0.3 acres) of the 100-foot buffer associated with the Neponset River bank. The expansion of the layover facility will also impact approximately 9,000 sf (0.2 acre) of potential isolated wetland areas. The DEIR indicated that if this is a classified isolated wetland resource area, it is not subject to jurisdiction under the WPA.

The DEIR described how each project element will be designed and constructed in a manner consistent with relevant performance standards established in the WPA Regulations (310 CMR 10.00).

The DEIR included a discussion of existing floodplain conditions and designations per the current and preliminary Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) within a one-half mile radius of each SSX project component. At the South Station site, based on wave interaction scenarios calculated for Fort Point Channel, the 100-year flood Zone AE has varying base flood elevations. The base flood elevation for the Zone AE in Fort Point Channel is 10 feet (North American Vertical Datum of 1988 (NAVD88)) for the area south of the site boundary, beginning west of Dorchester Ave, east of South Station in Fort Point Channel, the Zone AE area has a base flood elevation of 12 feet (NAVD88), and just south of the Northern Avenue Bridge, the Zone AE has a base elevation of 13 feet (NAVD88). The South Station study area also contains an area of Zone VE, which is the flood insurance rate zone that also corresponds to the 1% annual chance coastal flood, but has additional hazards associated with storm waves. The VE area in Boston Harbor ends at the mouth of Fort Point Channel and

has a base flood elevation of 14 feet (NAVD88) immediately northeast of the Northern Avenue Bridge.

The DEIR also noted that that the majority of the South Station study area floodplain extending beyond the surface water of Fort Point Channel is developed land, consisting of roads and commercial development. The extent of the 100-year coastal flood hazard zone includes portions of the site along Dorchester Avenue between the USPS General Mail Facility/South Postal Annex and the Fort Point Chanel, and extending to the I-90 ventilation building. One additional area of 100-year coastal flood zone occurs west of and adjacent to the Fairmount Line/Old Colony Railroad Bridge over Fort Point Channel. MassDOT indicated that based on site inspections, it appears that the vertical seawall/bulkheads along the channel predominantly contain the flood waters. The seawall/bulkheads are not a consistent elevation through the site, however, and locations where the 100-year coastal flood zone encroaches upon the site correlate with seawall/bulkheads with less height.

At Widett Circle, the 100-year flood zone does not encroach upon the site boundary; the Zone AE base flood hazard elevation is 10 feet (NAVD 88). In the Readville Yard 2 study area the Neponset River contains Zone AE area that coincide with the banks of the water body.

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The SSX project contains both filled and landlocked tidelands as defined in 310 CMR 9.00. The DEIR included graphics identifying key c.91 jurisdictional criteria (e.g., Mean High Water Mark (MHW), Historic Mean High and Mean Low Water Marks, filled tidelands, landlocked tidelands, etc.) at South Station Terminal and layover facility sites. The MHW of Fort Point Channel was determined to be 4.63 feet above mean sea level (NAVD 88). According to the DEIR, nearly all filled tidelands in the South Station site (including South Station, the USPS facility, MassDOT Vent Building #1 and the Dorchester Avenue extension) are held in fee by the Commonwealth or a quasi-public agency or authority in trust for the benefit of the public, and therefore meet the regulatory definition of Commonwealth Tidelands. Furthermore, the DEIR indicated that the filled tidelands at the South Station site do not meet the definition of landlocked tidelands.[7]

The Dorchester Avenue extension, which separates Fort Point Channel from the existing USPS facility, is owned in fee by the USPS, but the roadway is not open to the public at large for vehicular or pedestrian use. Accordingly, MassDOT concluded that this section of Dorchester Avenue does not meet the definition of a "public way" in the c.91 Waterways Regulations and does not by itself create landlocked tidelands at the South Station site. However, the DEIR noted that in 2000, during the planning for the SSAR, the Massachusetts Legislature created a very narrow exception to the landlocked tidelands provisions of c. 91. Section 85 of Chapter 235 of the 2000 Acts of Massachusetts General Court created a special exception under c. 91 to facilitate redevelopment on air-rights above intermodal transportation facilities that would be located on landlocked tidelands, but for the abandonment of an historic public way. While the statute does not specifically identify South Station as the focus of the Massachusetts Legislature's intent, the site meets the specific geographic criteria contained therein. Therefore,

[7] Landlocked tidelands are defined as filled tidelands which are entirely separated from flowed tidelands by one or more interconnected public ways in existence on January 1, 1984 (310 CMR 9.02).

for potential air-rights development at the South Station site, this statute creates landlocked tidelands at a point 250 feet landward of the existing mean high water of Fort Point Channel. The Joint/Private Development Alternative 3 reflects these design parameters in compliance with the c.91 regulations. The Widett Circle layover facility contains landlocked tidelands. Readville Yard 2 does not contain any filled or landlocked tidelands subject to the c.91.

The DEIR summarized prior c.91 licensing for the South Station site, noting the license number, year of licensure, licensee, and authorized work. The DEIR distinguished between historic/superseded licenses and those issued for utility work in Fort Point Channel, the Central Artery/Tunnel Project, and the original South Station headhouse and track construction work. The DEIR included a description of proposed structural alterations or changes in use at the South Station site in each of the Build Alternatives (Alternatives 1, 2 and 3).

Each Build Alternative will require a new waterways (c.91) license pursuant to 310 CMR 9.05(1)(a) and (d). The DEIR provided an extensive discussion of demonstrating how each Build Alternative and layover facilities will be designed to meet the c.91 licensing criteria for a non-water-dependent (transportation improvements, joint/private development) and water-dependent (Harborwalk extension) uses. The DEIR identified the applicability of c.91 Basic Licensing Requirements for each Build Alternative and included a supporting narrative describing project compliance with specific provisions.[8] The DEIR also described project consistency with the c.91 Proper Public Purpose requirements at 310 CMR 9.31(2).[9]

As noted previously, the parameters of Alternative 2 were predicated on the constraints imposed by the c.91 regulations regarding building setbacks and height limitations. The DEIR described proposed open spaces and project elements to activate the ground-level pedestrian environment and establish Facilities of Public Accommodation (FPAs).

The DEIR discussed how the project elements located in the Massachusetts Coastal Zone (i.e., South Station terminal and Widett Circle) comply with the Massachusetts Coastal Zone Policy for the purposes of Federal Consistency Review.

Municipal Harbor Plan

The Fort Point Downtown Municipal Harbor Plan (MHP) applies to approximately 37 acres of land and water and is generally bounded by the old Northern Avenue Bridge to the north, the West Fourth Street Bridge to the south, Fort Point Channel to the east, and Atlantic Avenue and the USPS parcel to the west. According to the DEIR, Phase 1 of the MHP was approved in October 2002 and renewed in February 2013. The Phase 1 MHP is specific to the property at 500 Atlantic Avenue. Phase 2 approval was granted in March 2004 and was specific to Atlantic Wharf only. At that time, the Secretary deferred approval of the Phase 2 area south of Summer Street, which includes the USPS parcel, pending the City's completion of a master planning effort for the South Station area. The master planning effort and MHP Amendment will draw from the BRA's Watersheet Activation Plan for the Fort Point Channel area for a list of potential public benefits for development projects along the Fort Point Channel.

[8] 310 CMR 9.31(1)(i) and 310 CMR 9.32; 9.33; 9.34; 9.35(2); 9.35(3); 9.35(4); 9.35(5); and 9.36-9.40.
[9] 310 CMR 9.51; 9.51(1); 9.51(2); 9.51(3)(d); 9.52; 9.53; 9.54; and 9.55;

As noted previously, the City's master planning efforts for the South Station/USPS area is ongoing and the Joint/Private Development Alternative 3 will require an amendment to the Phase 2 Fort Point Downtown MHP. To the extent that Alternative 3 will not meet the numeric standards under 310 CMR 9.00, substitute standards, referred to as "offsets and substitutions" will be required as part of an approved MHP. Potential offset measures anticipated for Alternative 3 will be determined during the preparation of the MHP and will be subject to additional technical and regulatory review during that public process. Such offset measures may include public programming and activation of the open space areas, and additional public amenities. The DEIR also noted that while the Joint/Private Development Alternative 2 is designed consistent with the c.91 regulations, pending decisions by the City of Boston's master planning process for the project area, this development alternative may also require an amendment to the Phase 2 Fort Point Downtown MHP.

Wind and Shadow Analyses

The DEIR included an analysis of potential impacts to the public realm from wind and shadow at the South Station terminal site in compliance with the c.91 regulations. The wind analysis evaluated mean speed and gusts for the No Build and Alternative 3 Build Conditions at 80 sensors located in the vicinity of South Station to identify the potential to exceed established wind speed criteria deemed comfortable for sitting, standing, and walking. Based upon the results of this analysis, MassDOT has incorporated mitigation into Alternative 3 in the form of high coniferous trees and screen walls at the ground plain near the project buildings proposed closest to the I-90 vent building and Dorchester Avenue. These mitigation measures are preliminary in nature and will be refined when final design takes place to ensure that wind conditions are suitable at the ground level environment but demonstrate that it is possible to reduce the wind speed at these potentially sensitive locations.

The DEIR also included a shadow analysis for the following alternatives to demonstrate compliance with the c.91 regulations:

- Existing Conditions (including the No Build Alternative which includes shadow impacts from the SSAR project);
- Alternative 1 – Transportation Improvements Only;
- Alternative 2 – Joint/Private Development Minimum Build; and
- Alternative 3 – Joint/Private Development Maximum Build.

The study used a 3D CAD model of the city and standard sun altitude and azimuth data for October 23. This date is typically accepted by MassDEP and CZM for shadow studies in c.91 jurisdiction. Hourly shadows were estimated from 9:00 AM through 6:00 PM. As stated in the DEIR, the shadow analysis examined the potential impacts to the ground-level public spaces within filled and flowed tidelands focusing on public open spaces, major pedestrian areas, sidewalks and the watersheet of Fort Point Channel. For the purposes of this analysis, shadows cast by proposed buildings or other structures onto existing or proposed buildings in the vicinity of South Station were not considered impacts because they do not meet the criteria established by 310 CMR 9.51(2)(c).

The results of the shadow study identified the following impacts on public spaces:

- Alternative 1 will not create any new shadows on exterior public spaces. As a nonwater-dependent infrastructure project, Alternative 1would not be subject to 310 CMR 9.51(2)(c).
- Alternative 2 will create net new shadows lasting greater than one hour on South Station site open spaces between the joint/private development buildings for several hours, and late day shadows on the eastern shoreline of Fort Point Channel for approximately one hour, falling on sections of the Boston Harborwalk and across the Fort Point Channel. Alternative 2 will meet the c.91 standards for building height and setback and MassDOT does not expect that mitigation for these impacts will be required.
- Alternative 3 will create new shadows within the South Station site open spaces between the joint/private development buildings for a substantial portion of the day, shading each for approximately four to eight hours. Alternative 3 will also shade approximately 1,000 linear feet of the eastern shoreline of Fort Point Channel for approximately one hour late in the day. New shadows are also expected on the Fort Point Channel watersheet in the afternoon. MassDOT opined that the predicted shadows on the South Boston shoreline of Fort Point Channel are not expected to have any adverse effects on public use of these spaces because much of the surrounding areas will already be shaded.

The DEIR also noted that MassDOT does not anticipate a mitigation requirement for new shadows cast on Dorchester Avenue because the Build Alternatives will result in a substantial net benefit to public use of the waterfront. MassDOT also opined that mitigation should not be required for the predicted new shadows on the South Boston waterfront shoreline of Fort Point Channel because of the brief duration.

The DEIR included a discussion of how the project will comply with the Public Benefit Determination (301 CMR 13.00) criteria established for non-water-dependent projects located completely or partially within tidelands or landlocked tidelands. This included a discussion of : the purpose and effect of the project, impact of the project on abutters and the surrounding community, enhancement to the property, benefits to the public trust rights in tidelands, benefits provided through previously obtained municipal permits, community activities on the South Station site, environmental protection and preservation, and public health, safety, and general welfare. Key project elements consistent with the regulations include, but are not limited to, reopening Dorchester Avenue to the public, construction of an extension of the Harborwalk, and reactivation of filled tidelands through mixed-use development and expanded transit, bicycle and pedestrian access. The DEIR concluded that the project will meet the requirements of *An Act Relative to Licensing Requirements for Certain Tidelands* (2007 Mass. Acts ch. 168, sec.8) by providing appropriate public benefits and adequately protecting the public trust rights inherent to tidelands.

Climate Change Adaptation and Resiliency

As noted in the Certificate on the ENF, the project is a critical piece of infrastructure not only for the City of Boston and the surrounding region, but is key to the operation of the NEC. As a coastal city, the project has an increased susceptibility to potential damage associated with the affects of climate change, most notably sea-level rise and flooding impacts due to increased storm frequency and intensity.

I commend MassDOT for undertaking a thorough evaluation of potential climate change-induced impacts on the SSX project. The DEIR contained a discussion of potential impacts associated with four categories of concern: storm intensity and frequency; excessive heat; sea level rise, storm surge and floodplains; and hurricane surge. MassDOT noted that in addition to using an analysis of potential climate change impact to inform design elements to be implemented upon construction, this analysis will be used to ensure that the ability to make future modifications will not be precluded.

The DEIR noted the potential for increased storm intensity and frequency to result in reduced function and performance of storm drainage systems and infrastructure supported by those systems. MassDOT intends to reuse portions of existing drainage infrastructure that discharges to Fort Point Channel. These drainage systems were designed using historic precipitation records and predictive models and may not be reflective of currently changing weather patterns. MassDOT will analyze portions of the drainage system to be reused to confirm acceptability for use with evolving precipitation intensity and frequency data, and rising sea levels. The DEIR also stated that increased heat can affect tracks by the expansion of steel rail causing buckling, or possibly causing electrical component failures for devices operating outside of normal temperature conditions. These failures have the potential to cause severe public safety risks or service disruptions. MassDOT intends to consider methods of track manufacturing and installation designed to minimize the buckling effect when developing engineering plans for the SSX project.

The DEIR included an assessment of the impacts of a two-foot sea level rise upon the SSX project, which is consistent with planning for a project with a design life of 50 years, the minimum sea level rise recommended by CZM. Sea level rise will increase the height of storm surges and associated coastal flooding frequencies and permanently inundate low-lying coastal areas. To assess the project's vulnerability to flooding, floodplains in the DEIR study areas were identified using both the effective 2009 and preliminary 2015 FEMA FIRM and Flood Insurance Study (FIS). The DEIR acknowledged that FEMA's current floodplain maps are based upon existing sea levels and historical data and do not account for sea level rise. The study presented in the DEIR estimated the potential reach of future coastal flood zones due to sea level rise by determining existing ground elevations and adding a two-foot sea level rise to the existing FEMA flood elevations. The DEIR noted that this analysis that doesn't take into account changes in bathymetry effecting flooding characteristics. The DEIR included graphics depicting potential areas of inundation in a 100-year flooding event with an additional two-foot sea level rise for the South Station and layover facility sites. This analysis identified the following potential impacts:

- South Station Site - In the absence of mitigation, the 100-year floodplain would encompass approximately 38 acres of the SSX project footprint, representing nearly complete inundation of the site and infrastructure, during a 100-year flood event.
- Widett Circle - The existing 100-year flood elevation does not reach the Widett Circle layover facility site by an overland connection. However, based upon a review of mapped ground elevations at the site, the layover facility site is at or slightly below the 100-year flood elevation depicted at the southern end of Fort Point Channel. There could be risks of flooding through unknown underground connections, such as storm drainage pipes. A future two-foot sea level rise on top of a 100-year flood event would create a direct overland connection to Fort Point Channel, resulting in complete inundation of the 30 acre-layover facility.
- Readville Yard 2 - Based upon the distance of the site from the ocean, the site's elevation, and the presence of downstream dams, it is anticipated that no changes to the 100-year floodplain would occur due to a two-foot rise in sea level.

The DEIR also included an analysis of storm-based flooding scenarios, as these storms can result in water levels that far exceed those experienced during the 100-year flooding event depicted on the FIRMs. MassDOT evaluated potential project site inundation areas using Hurricane Surge Inundation Maps produced as part of a Massachusetts Hurricane Evacuation Study. These maps were produced by FEMA and the Army Corps of Engineers using the Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model. The maps show areas of coastal Massachusetts that would become inundated based upon different categories of hurricanes, ranging in strength from Category 1 to Category 4. The hurricane inundation modeling for the Boston area accounts for two potential scenarios: hurricanes with tracks from south or southwest to north or northeast and those that follow a path directly toward land from offshore (from southeast or east). As noted in the DEIR, hurricanes with tracks from south or southwest to north or northeast are predicted to have lower surge levels than those with tracks from the southeast or east.

This analysis identified the following potential impacts:

- South Station Site –A Category 1 hurricane from the east or southeast will inundate portions of the South Station project footprint, including areas along Dorchester Avenue and some areas along the western site boundary. A Category 2 hurricane from the east or southeast will inundate the majority of the area within the project footprint, with the exception of northern portions of the site from the USPS facility extending west to portions of the South Station headhouse. A Category 3 hurricane from the east or southeast will encompass the entire South Station project footprint and surrounding areas, and extend approximately 1,500 feet inland from Fort Point Channel. If the hurricane paths were from the south or southwest, the South Station footprint would not become inundated by Category 1 or 2 storms. Stronger hurricanes categorized as Category 3 and 4 would inundate much of the site, leaving only the northern portions of the USPS facility and headhouse above water.
- Widett Circle – a Category 1 hurricane from the east or southeast will completely flood the layover site, along with the majority of South Boston, Back Bay, and the

Fort Point Channel area, thereby making it the most vulnerable to hurricane surges of all four SSX project sites. If the hurricane path were from the south or southwest, a Category 2 storm or stronger would completely inundate the site.

- Readville Yard 2 – Hurricane surge inundation modeling indicates that this layover facility is not at risk of surge damage resulting from any of the existing hurricane scenarios.

The DEIR included a comparative table of the types of threats (risks) associated with sea level rise or a hurricane and a range of reasonably foreseeable mitigation measures that may be appropriate to address each risk for the station and layover sites. This table also qualitatively categorized potential mitigation measures by their likely relative cost to implement.

Stormwater

The DEIR described existing and proposed stormwater management infrastructure, groundwater and surface water quality conditions within a one-half-mile radius around the South Station and layover facility sites. The DEIR also presented conceptual existing and proposed stormwater runoff rates and volumes for the 2-, 10-, 50- and 100-year storm events at South Station and layover facilities.[10]

South Station is located adjacent to Fort Point Chanel, which is part of Boston Inner Harbor. Boston Inner Harbor is included on MassDEP's *Massachusetts Year 2012 Integrated List of Waters* as a Category 5 water body and impaired for polychlorinated biphenyls (PCBs) in fish tissue, fecal coliform, enterococcus, dissolved oxygen, and other impairments. A draft Total Maximum Daily Load (TMDL) for Boston Harbor (in its entirety) has been established. Furthermore, the EPA has authorized a total of 36 combined sewer overflows (CSOs) and six NPDES permitted discharges in Boston Harbor. The DEIR identified and described seven CSOs and ten stormwater outfalls discharging to Fort Point Channel. Of the seven CSOs, three are in the immediate vicinity of the South Station site (CSO 064, CSO 065 and CSO 068). The DEIR summarized recent and ongoing efforts by the MWRA to reduce CSOs to Fort Point Channel and Boston Harbor.

The DEIR noted the elevation of each dedicated stormwater outfall, indicating that each outfall is below the highest observed water level in Fort Point Channel (9.6 feet NAVD 88). None of the dedicated stormwater outfall structures have tide gates; plans indicate that CSO 065 does. The DEIR indicated that coastal storm events could affect the functionality of the storm drain outfall to Fort Point Channel on Dorchester Avenue. The existing ground elevation at South Station varies from approximately nine to 16 feet (NAVD 88), meaning that existing "freeboard" ranges from five to 12 feet above the normal daily tidal water levels (MHW). Projected 100-year flood elevations in Fort Point Channel range from 10 to 13 feet (NAVD 88). The DEIR stated that much of the South Station site will be subjected to higher coastal storm tailwater discharge elevations than in the past, eventually returning to draining via gravity once flood levels return to normal.

[10] Preliminary drainage analyses compared Alternative 1 – Transportation Only Improvements with Alternative 3 – Maximum Joint/Private Development. The runoff rates and volumes for Alternative 2 – Minimum Joint/Private Development scenario are anticipated to be the same as those in Alternative 3.

Stormwater from the South Station parcel is collected in closed drainage systems with no associated detention, infiltration or treatment measures. Stormwater from South Station, including tracks and interlockings discharge to either dedicated stormwater outfalls or CSOs. Existing drainage from the USPS parcel, including roof runoff, collects in a closed drainage system and discharges separately from the South Station site to Fort Point Channel. Approximately 1,800 linear feet of track extending into the Cove Interlocking is located within City of Boston's Groundwater Conservation Overlay District (GCOD). However, South Station site itself is outside the GCOD, and on-site improvements do not need to comply with these requirements.

The DEIR also described existing stormwater discharges and infrastructure at each layover facility. Widett Circle is completely impervious with stormwater collected in a series of catch basins located within parking areas and along Widett Circle Road and Foodmart Road. Stormwater from catch basins is collected in a 36-inch storm drain which ties into the overflow portion of a large combined sewer that runs north and south adjacent to the facility, ultimately discharging to Fort Point Channel. There are currently no stormwater detention, infiltration, or treatment facilities at Widett Circle. Readville Yard 2 is located near the Neponset River. The Neponset River is designated by MassDEP as a Class B water and an area south of the site is included in the Fowl Meadow and Ponkapoag Bog Area of Critical Environmental Concern (ACEC). Drainage from Readville Yard 2 discharges to a segment of the Neponset River which is included in MassDEP's *Massachusetts Year 2012 Integrated List of Waters* as a Category 5 water body and impaired for dissolved oxygen, fecal coliform, turbidity, foam/flocs/scum/oil slicks, PCB in fish tissue, debis/flotables/trash, DDT, *e.coli*, and other. In 2002, MassDEP issued a bacterial TMDL for the Neponset River Watershed that includes all segments of the Neponset River. Readville Yard 2 is generally impervious. Existing ballasted tracks include underdrains that discharge via a 12-inch storm drain to the Neponset River. Other site-generated stormwater discharges to a 54-inch storm drain that crosses through the southern portion of the site. Tracks where trains are stored include drip pans which are drained to oil/water separators for treatment prior to discharge to the sanitary sewer system. Similar to Widett Circle, there are currently no stormwater detention, infiltration, or treatment facilities on-site.

Each project site will be designed and constructed in accordance with the MassDEP Stormwater Management Standards (SMS). The DEIR included a brief summary of how the project intends to comply with the SMS, as applicable. Most elements of the SSX project are expected to qualify as redevelopment projects and must meet the redevelopment standards identified in the Wetlands Protection Act regulations. Work proposed at Readville Yard 2 will be required to comply with the SMS in their entirety, as this in not categorized as a redevelopment project.

The DEIR listed non-structural and structural best management practices (BMPs), practices and procedures to mitigate project-related stormwater impacts. Potential non structural BMPs include snow removal and management measures, spill prevention; and source control. The MBTA will develop a detailed operation and maintenance (O&M) plan for each site that addresses specific BMP maintenance measures. The DEIR also described potential structural BMPs that are proposed at each project site. This list also noted those BMPs that may not be appropriate due to identified site constraints (e.g., utility conflicts, unfavorable soil conditions,

etc.,) or those that will not be required to meet stormwater management standards. MassDOT will select BMPs specifically capable of treating urban pollutants and other contributing sources to meet the applicable TMDLs established for Boston Harbor and the Neponset River.

The DEIR indicated that improvements to the existing stormwater management system at the South Station site will be designed in accordance with applicable MassDEP SMS, BWSC standards and design of the stormwater management system for tracks and platforms will be based on the MBTA *Commuter Rail Design Standards Manual.* Similar to BMPs in place at Readville Yard 2, track drainage will include track ballast underlain with a relatively impervious subgrade crowned at each track centerline and drip pans within the rack expansion area. Drip pans will be connected to an oil/water separator prior to discharge to the closed drainage system or sewer system. MassDOT intends to retain the USPS facility closed drainage system to convey roof drainage from the South Station expansion to Fort Point Channel. The existing 81-inch by 81-inch CSO (CSO 065) pipe that crosses Dorchester Avenue and the 64-inch CSO (CSO 064) pipe within Summer Street will be retained and used for drainage connections from South Station. Potential BMPs include deep sump hooded catch basins and proprietary separators to manage Total Suspended Solids (TSS).

The DEIR stated that stormwater management along Dorchester Avenue will be designed based on the MassDOT Project Development Design Guide and will meet the MassDOT Complete Streets guidelines and the City of Boston Complete Streets requirements. The DEIR included an analysis of proposed improvements demonstrating consistency with the Complete Streets initiatives. For all build alternatives, an increase in on-site pervious area is anticipated and low impact design (LID) BMPs such as pervious pavers, bioretention/rain gardens and/or tree box filters are expected to reduce stormwater runoff. The DEIR indicated that stormwater flow rates and runoff volumes at the South Station site will be reduced in all build alternatives compared to the No Build Alternative. While proposed stormwater discharges will continue to be conveyed via CSOs, MassDOT concluded that there will be no impact to the frequency or volume of overflows to the BWSC system due to the anticipated reduction in impervious area and corresponding runoff volumes. Additionally, connections associated with stormwater flows from Dorchester Avenue are expected to tie-in downstream of CSOs, resulting in no impact to the frequency and volume of overflows from the system. Stormwater management BMPs will be utilized to remove TSS and other pollutants from stormwater runoff. The DEIR noted that many BMPs may be impractical to use on-site due to site limitations and the vertical separation between Fort Point Channel and the topography of the site. No new outfalls are proposed.

Stormwater management at each of the layover sites will be designed based on the MassDOT Project Development Design Guide. Locomotive storage areas will include drip pans connected to oil/water separators for pre-treatment prior to connection to the closed drainage system or sewer system. At Widett Circle, proposed stormwater discharges will connect to the existing connection with a 17-foot by 13.5-foot BWSC CSO (CSO 070) that runs under the Widett Circle roadway and discharges into Fort Point Channel. The proposed peak flow rates and runoff volumes are projected to be lower than the No Build Alternative due to an increase in permeable area. The proposed tie-in location is beyond the overflow connection point and should result in no impact on the frequency or volume of overflows from the system. At Readville Yard 2, the existing 54-inch storm drain may need to be relocated based on the

condition of the structure. The expansion of the layover facility will result in an increase of on-site impervious area and a corresponding increase in stormwater peak flow rates. Site-generated stormwater will continue to discharge to the Neponset River via a separate stormwater system. The Readville Yard 2 expansion area will include BMPs to the maximum extent practicable to manage stormwater peak flows and water quality.

The DEIR noted that industrial activities such as those proposed at the layover facilities are regulated under the NPDES Multi-Sector General Permit (MSGP). Compliance with the NPDES MSGP is expected to include requirements such as stormwater effluent limits, monitoring requirements, and other conditions related to post-construction operations at the layover sites.

Water Supply and Wastewater

The DEIR described project-related impacts to water use and wastewater generation. The MWRA provided potable water to the SSX project area, with the BWSC servicing individual properties through its water and wastewater network. Wastewater from BWSC's system is treated at MWRA's Deer Island Wastewater Treatment Facility, which ultimately discharges to Massachusetts Bay. The DEIR did not identify any potential system capacity constraints associated with project's maximum build scenario.

The DEIR described existing water use and wastewater generation conditions at the South Station and layover facility sites, with a description and supporting graphic generally depicting the type, diameter and location of these utilities. The DEIR cited the following existing flow rates:

- *South Station* – 338,950 gallons per day (gpd) wastewater generation and 372,850 gpd water use;
- *Widett Circle* – 13,140 gpd wastewater generation and 14,460 gpd water use; and
- *Readville Yard 2* – 1,950 gpd wastewater generation and 2,150 gpd water use.

The South Station site is surrounded by water and wastewater infrastructure located in adjacent City streets. CSO 065 appears to bisect the property from west to east, located under the existing bus terminal, tracks, and the USPS facilty. The eastern part of Widett Circle is bisected by a 20-inch by 16-inch CSO line (CSO 070) and a 66-inch by 92-inch CSO line from the southeast ties into the trunk line on-site. BWSC water mains, sewers and CSOs are also located within Widett Circle and Foodmart Road. The Readville Yard 2 site contains a 10-inch water main that crosses the site to provide water service to the existing facilities and connects the neighborhood south of the site to a 12-inch water main in Truman Highway. Wastewater is discharged from the layover facility to an 8-inch separated sewer main in Wolcott Street.

The DEIR assessed potential water and wastewater impacts at the South Station site by comparing demand and generation estimates in the Maximum Joint/Private Development scenario (Alternative 3) to existing rates. These estimates were provided by use for the South Station terminal and the mixed-use development. Wastewater generation in Alternative 3 was estimated at 750,900 gpd and water demand was estimated at 826,000 gpd, an increase of 122

percent. The DEIR noted that the estimated water usage and wastewater generation at the South Station site would be partially offset by the removal of the USPS facility (22,720 gpd of wastewater and 24,992 gpd of water). Upgrades to existing BWSC water and sewer mains along Atlantic Avenue and Summer Street will be required in Alternative 3. Depending upon project sequencing in Alternative 3, new service connections may be required along Dorchester Avenue. The DEIR did not identify any additional utility connections to the existing infrastructure are part of the project. Projected increases in wastewater generation at the South Station site will require MassDOT to meet inflow and infiltration (I/I) offset requirements established by MassDEP's *Policy on Managing Infiltration and Inflow in MWRA Community Sewer Systems* (BRP 09-01) and with BWSC policy and regulations.

The DEIR indicated that the layover facilities will require sewer connections for the crew building and support shed at each site. The DEIR indicated that only light maintenance activities are proposed at the facilities. Therefore, no industrial wastewater is anticipated to be generated. Proposed wastewater generation and water demand estimates were identified for each layover facility by use type. Wastewater generation at Widett Circle was estimated at 5,850 gpd, with a water demand of 6,440 gpd. The demand estimates for the Widett Circle layover facility are less than existing uses, resulting in a decrease in wastewater generation and water use by 7,290 gpd and 8,020 gpd, respectively. Wastewater generation for Readville Yard 2 expansion area was estimated at 1,560 gpd, with an additional water demand of 1,720 gpd. Total proposed wastewater generation at Readville Yard 2 will increase to 3,510 gpd and water use will increase to 3,870 gpd. The DEIR conceptually identified potential utility tie-in connections at each layover location. At the Widett Circle site, wastewater will discharge to the existing BWSC 15-inch separated sewer in Widett Circle loop road and existing unused mains and services on site will either be removed or abandoned in place. The build condition at Widett Circle will not exceed MassDEP's requirement to provide I/I offsets. However, abandonment of existing infrastructure could reduce the amount of I/I entering the BWSC system. Water service will be provided from one or more connections to the existing BWSC water mains the Widett Circle loop road. At Readville Yard 2 proposed wastewater improvements will include new gravity services to the BWSC utilities and/or internal plumbing connections. Proposed water improvements include relocating the existing water main that bisects the site to prevent it from being covered by proposed buildings. Again, the build condition at Readville Yard 2 will not exceed MassDEP's requirement to provide I/I offsets.

The DEIR identified potential water and wastewater mitigation measures in association with the project. These include efficiency measures to meet MassDOT GreenDOT water and wastewater sustainability goals. To mitigate discharges to CSOs MassDOT intends to provide the required separation from other utilities, including site wastewater systems, when connecting new water mains and connect wastewater discharges to separated sewer systems to the maximum extent practicable. The DEIR generally identified opportunities to meet the I/I offset requirements by improving issues in Dorchester Avenue and the North End. MassDOT should coordinate with MassDEP, BWSC and the MWRA to develop an I/I plan to mitigate wastewater flows on a 4:1 basis in a hydraulically connected sewer system as design advances.

Traffic and Transportation

As noted in the DEIR, the project will provide regional and local transportation and traffic benefits: enhanced transit capacity, regionally and locally to downtown Boston; more efficient train operations; integration of the South Station rail and bus terminals; new pedestrian connections and potential for enhanced waterfront access; new bicycle accommodations; relief of curbside congestion on Atlantic Avenue; improved separation of South Station vehicle traffic and pedestrians/bicyclists; limited parking through the use of shared parking; and restoration of a key roadway connection, Dorchester Avenue.

Public Transit Services

The DEIR provided an overview of the existing and proposed regional and local transportation services utilizing South Station, including existing services, ridership, and capacity, and impacts of proposed ridership upon the public transportation system. Public transportation infrastructure relative to South Station encompasses Amtrak intercity and MBTA commuter rail service, MBTA rapid transit service, MBTA local bus service, and private carrier bus service. The transportation study analyzed project-related impacts for the following scenarios:

- 2012 Existing Condition;
- 2025 and 2035 No Build Condition;
- 2025 and 2035 Alternative 1 Condition;
- 2025 and 2035 Alternative 2, Condition; and
- 2025 and 2035 Alternative 3 Condition.

South Station currently (2012) handles approximately 128,000 daily combined Amtrak, MBTA, and intercity/commuter bus boardings and alightings.

	Amtrak	Commuter Rail	Amtrak and Commuter Rail Total	Red Line	Silver Line	Local Bus	Intercity/ Commuter Bus	Total
Existing Conditions	4,100	42,000	46,000	54,000	12,700	2,900	12,200	128,000

The current Amtrak schedule includes 10 weekday roundtrip Acela Express trains between Boston and Washington DC, nine weekday roundtrip Northeast Regional trains between Boston and Newport News, Viginia, and one weekday roundtrip Lake Shore Limited train between Boston and Chicago.

The DEIR also tabulated 2012 weekday MBTA commuter rail boardings and alightings by MBTA route:

MBTA Route	Inbound Alightings at South Station	Outbound Boardings at South Station	Total Boardings & Alightings at South Station
Fairmount Line	364	403	767
Framingham/Worcester Line	3,395	3,802	7,197
Franklin Line	2,759	3,016	5,775
Greenbush Line	1,883	1,934	3,817
Kingston/Plymouth Line	2,468	2,385	4,853
Middleborough/Lakeville Line	2,038	2,263	4,301
Needham Line	1,623	1,894	3,517
Providence/Stoughton Line	5,412	6,075	11,487
Total	**19,942**	**21,772**	**41,714**

The DEIR described potential ridership impacts using data provided by the Central Transportation Planning Staff (CTPS) and Amtrak. The 2035 travel demand forecasts provided by CTPS assume the implementation of transportation projects by 2035, consistent with the currently adopted RTP of the Boston Region Metropolitan Area Planning Organization (MPO). MassDOT also adjusted the CTPS data to include projected Silver Line Gateway ridership, as this is not in the current RTP, and ridership growth on intercity and commuter bus routes, as these are not in tabulated in the CTPS model, expansion of Amtrak intercity rail service, and the South Coast Rail commuter rail extension to New Bedford. I note that while the SSAR project will expand bus terminal capacity, no specific future year plans for the existing private bus carriers were available for use in the analysis. Therefore, intercity/commuter bus service levels were assumed to remain constant between the 2012 Existing Condition and the 2035 Build Alternatives. The analysis also considered pedestrian transfers between modes within South Station using CTPS transfer matrices. These ridership data were provided for each analyzed scenario by transit type (e.g., Amtrak, MBTA Red Line, MBTA local bus, etc.) in the years 2025 and 2035.

2025 Daily Combined South Station Boardings and Alightings:

Joint/Private Development Alternative	Amtrak	MBTA Commuter Rail	Amtrak and Commuter Rail Total[a]	MBTA Red Line	MBTA Silver Line	MBTA Local Bus	Intercity/ Commuter Bus	Total[a]
Existing Conditions	4,100	42,000	46,000	54,000	12,700	2,900	12,200	128,000
No Build Alternative	5,200	53,000	58,000	68,000	22,800	3,600	12,700	165,000
Alternative 1	8,100	65,000	74,000	70,000	23,200	3,600	12,500	183,000
Alternative 2	8,100	66,000	74,000	70,000	23,200	3,700	12,700	183,000
Alternative 3	8,100	67,000	75,000	72,000	23,600	3,800	13,100	187,000

2035 Daily Combined South Station Boardings and Alightings:

Joint/Private Development Alternative	Amtrak	MBTA Commuter Rail	Amtrak and Commuter Rail Total[a]	MBTA Red Line	MBTA Silver Line	MBTA Local Bus	Intercity/ Commuter Bus	Total[a]
Existing Conditions	4,100	42,000	46,000	54,000	12,700	2,900	12,200	128,000
No Build Alternative	5,500	56,000	61,000	72,000	25,600	3,800	12,800	175,000
Alternative 1	9,300	72,000	81,000	74,000	26,100	3,800	12,600	198,000
Alternative 2	9,300	72,000	81,000	75,000	26,200	3,900	12,800	199,000
Alternative 3	9,300	74,000	83,000	77,000	26,700	4,000	13,300	203,000

As indicated by these ridership forecasts, significant increases in ridership across all modes are anticipated in the No Build Alternative. Additional ridership in the Build Alternatives is directly attributable to the increased transit service facilitated by the expansion of South Station and the air rights development.

The DEIR assessed the impacts of increased ridership at South Station in the Build Alternatives upon future capacity of the MBTA's commuter rail, rapid transit, and local bus routes. This analysis included an assessment of existing and proposed station and platform capacities at South Station and key stations within the MBTA's system's downtown core (i.e., Park Street, Downtown Crossing, State Street, and Government Center). Existing and projected ridership demands for each alternative scenario were compared to available vehicle capacities per the MBTA's *Service Delivery Policy*, the parameters of which were summarized in the DEIR.

Increased ridership on rapid transit or local bus routes attributable to the project is not expected to result in additional crowding impacts that exceed the *Service Delivery Policy* maximum load beyond those already identified in the No Build Alternative. All 2035 Alternatives (No Build and Build), will result in loading on the Silver Line 4 and Silver Line 5 Bus Rapid Transit (BRT) routes anticipated to exceed *Service Delivery Policy* capacity. The DEIR noted that projected overcrowding on the Silver Line 4 and Silver Line 5 routes, however, is due to growth in the No Build Alternative, such as forecasted growth in population, households, and employment, as well as changes in land use and transit services, including increased frequencies on the Fairmount Line and the proposed Silver Line Gateway project, and is not a result of the SSX project.

For commuter rail, the DEIR indicated that 2035 Build Alternative passenger loading on the outbound Canton/Stoughton/South Coast Rail Line is projected to exceed the *Service Delivery Policy's* acceptable level of crowding during the peak evening hour. However, more than sufficient capacity to accommodate the projected passenger load demands will be available within the entire three-hour evening peak period. Adjustments to train schedules could be made to shift peak period trains into the peak hour to mitigate this potential overcrowding.

The DEIR concluded that project-related ridership increases at stations in the downtown core will be imperceptible. At these stations, additional daily boardings and alightings due to the

Build Alternatives are projected to result in a less than one percent increase above 2035 No Build Alternative conditions.

The DEIR included an analysis of pedestrian circulation LOS for the 2012 Existing Condition, the 2035 No Build Condition and the 2035 Alternative 3 Condition. Pedestrian LOS during peak hour ridership periods was evaluated for existing and new commuter and intercity rail platforms, passenger waiting areas adjacent to existing and new platforms (rail head concourse), vertical circulation elements (stairs and escalators), and existing Red Line and Silver Line platforms. This analysis considered the types and locations of trains arriving at South Station (i.e., number of passengers, track location, passenger circulation routes, platform width and length, etc.) in assessing LOS, assuming worst-case scenario to ensure an assessment of maximum potential impact.

This analysis identified worsening LOS compared to the No Build Condition on the existing at-grade commuter and intercity rail platforms in Alternative 3 with poor LOS (LOS E/F) occurring more frequently in Alternative 3 due to the increased number of trains and ridership. Vertical circulation LOS in Alternative 3 is projected to be slightly worse than the No Build Condition, but an acceptable LOS (LOS D) or better is maintained throughout the morning and evening peaks periods. The project will increase pedestrian flows at South Station, with a projected two to four percent increase in daily Silver Line platform activity and an up to six percent increase in passenger activity on South Station's Red Line platforms compared to 2035 No Build Conditions. Compared to the No Build Alternative, Alternative 3 is projected to result in a slightly reduced LOS on the Red Line (LOS D or better) and Silver Line (LOS C or better) platforms during the morning and evening peak hours.

Traffic

The DEIR included a Traffic Impact and Access Study (TIAS) prepared in accordance with EEA/MassDOT Guidelines for EIR/EIS Traffic Impact Assessments. The study area intersections were selected in coordination with the BTD and the BRA.

The study area intersections for the South Station site included the following 21 intersections that were chosen due to their proximity to South Station and the likelihood that they might be affected by the project:

1. Congress Street / Dorchester Avenue
2. Summer Street / Dorchester Avenue
3. Atlantic Avenue / I-93 On-Ramp / Seaport Boulevard
4. Atlantic Avenue / Congress Street
5. Purchase Street / Congress Street
6. Atlantic Avenue / Summer Street
7. Summer Street / Purchase Street / Surface Road
8. Atlantic Avenue / Essex Street
9. Surface Road / Lincoln Street / Essex Street
10. Atlantic Avenue / East Street
11. Atlantic Avenue / Beach Street
12. Kneeland Street / Atlantic Avenue / Frontage Road / I-90 Off-Ramp

13. Kneeland Street / Lincoln Street
14. Kneeland Street / Surface Road
15. South Station Connector / Lincoln Street / I-93 On-Ramp / I-90 and I-93 HOV Ramp
16. Surface Road / South Station Connector
17. Dorchester Avenue / West 2nd Street
18. Dorchester Avenue / West Broadway
19. Dorchester Avenue / West 4th Street
20. Purchase Street / Seaport Boulevard / Oliver Street / I-93 Off-Ramp
21. Congress Street / A Street / Thompson Place

The study area intersections for the layover facility sites include:

1. Frontage Road / Widett Circle Access Road (Widett Circle Layover Facility Site)
2. Widett Circle / Widett Circle Access Road (Widett Circle Layover Facility Site)
3. Hyde Park Avenue / Neponset Valley Parkway / Wolcott Court / Wolcott Square (Readville-Yard 2 Layover Facility Site)
4. Wolcott Court / Layover Driveway (Readville-Yard 2 Layover Facility Site)

The DEIR described existing roadway infrastructure and existing and proposed intersection conditions. MassDOT performed data collection and modeling analyses of intersection operations within the study area and presented intersection and roadway traffic volumes, LOS, volume to capacity ratios and 95th percentile queue lengths for the 2012 Existing Condition, 2025 and 2035 No Build Conditions and 2025 and 2035 conditions for each Build Alternative (Alternatives 1, 2, and 3) in the DEIR. The DEIR summarized known development projects and annual growth rate projections incorporated in to future year (2025 and 2035) analyses. For the Build Alternatives, projected trip generation rates were estimated using the ITE Trip Generation Manual and adjusted to account for mode split, vehicle occupancy, and internal capture per guidance from MassDOT, CTPS, and BTD. Layover facility intersection capacity analyses were identical in each Build Alternative (Alternatives 1, 2, and 3), as layover operations, and resultant traffic generation will not change. To determine if there are existing safety concerns for vehicles, pedestrians or cyclists at study area intersections, MassDOT reviewed the most recently available crash data and compared these rates to MassDOT District 6 averages. All intersections within the study area are below the average crash rate for District 6.

The DEIR indicated that under Existing Conditions (2012) South Station generates approximately 5,400 average daily trips (adt), including 3,400 curbside trips along Atlantic Avenue, 1,400 passenger vehicle trips to/from the high occupancy vehicle (HOV) parking deck, and 600 bus trips to/from the bus terminal.

MassDOT conducted a curbside queue study that indicated that the existing layout along Atlantic Avenue creates curbside congestion at certain peak times of the day, with curb space not meeting peak demand. The DEIR identified the following key issues that contribute to curbside congestion:

- Curbside drop-off/pick-up and taxi activity utilizing the first available curbside slots, leaving the dedicated passenger drop-off/pick-up area adjacent to the bus terminal underutilized;

- Taxis and passenger vehicles using the no stopping zones for curbside drop-off/pick-ups. These no stopping zones are located within intersections along Atlantic Avenue;
- The number of taxis staging for passenger pick-ups in the taxicab pick-up zone (Zone 7) exceeds the dedicated curb capacity and results in the taxis spilling into the street and blocking travel lanes;
- Poor signage, both for wayfinding and designating curbside uses;
- Articulated Silver Line 4 buses takes very wide turns from Essex Street onto Atlantic Avenue impacting traffic flow by requiring the bus to use the entire Atlantic Avenue/Essex Street intersection to maneuver; and
- Frequent jaywalking across Atlantic Avenue.

Furthermore, Atlantic Avenue's one-way street pattern creates circuitous routes to South Station curbside from downtown, resulting in drop-off and pick-up activity in Dewey Square, within the Essex Street intersection, and at the intersection of Summer Street and Dorchester Avenue. The project directly addresses the curbside issues by reopening Dorchester Avenue as a public way and shifting a substantial portion of demand to this roadway segment. The cross-section of the newly opened Dorchester Avenue will accommodate curbside activity along the length of the new headhouse on the southbound side of the newly opened street. This curb space will be designed to accommodate taxicabs, drop-off, pick-up, MBTA buses, and shuttles – providing significant relief of Atlantic Avenue amounting to a 30 percent to 40 percent reduction in curbside traffic. Reopening Dorchester Avenue will also improve traffic flow in the area by absorbing a portion of traffic from A Street, Atlantic Avenue, and Summer Street. These traffic shifts help relieve congestion on these roadways and also create more direct vehicular trips on less congested roadways which benefits regional air quality. In Alternatives 2 and 3, a new service road will be constructed linking the back of the expanded station with the South Station Connector, the existing elevated roadway linking Surface Road and Lincoln Street with the bus terminal and parking deck, providing an additional route for taxicabs and pick-up/drop-off activity to and from I-90 and I-93.

I note that many study area intersections will continue to operate poorly (LOS E or F) in all 2025 and 2035 alternatives (No Build and Build) in the morning and evening peak periods, typical of a downtown environment. The DEIR included a comparative table of these intersection capacities.

Alternative	AM Peak Hour Overall Intersection Capacity		PM Peak Hour Overall Intersection Capacity	
	LOS D or better 2025/2035	LOS E or LOS F 2025/2035	LOS D or better 2025/2035	LOS E or LOS F 2025/2035
No Build Alternative	14/11	7/10	11/9[a]	10/12
Alternative 1	15[a]/13[a]	6/8	12/11	9/10
Alternative 2	15[a]/13[a]	6/8	10/9[a]	11/12
Alternative 3	14[a]/13[a]	7/8	9[a]/9[a]	12/12

[a] The overall LOS rating applies with the exception of one approach, which operates at a lower LOS.

Pedestrian and Bicycle Accommodations

MassDOT conducted pedestrian and bicycle volume counts within the Study Area, noting key routes of travel by each mode. The DEIR also summarized South Station monthly Hubway use for the three most active periods (August, September, and October) and the most popular origin and destination docking stations for South Station Hubway trips.

The reopening of Dorchester Avenue prioritizes pedestrian and bicycle accommodations on the Fort Point Channel side of the roadway, separated from the vehicular curbside activity at the new station headhouse on Dorchester Avenue. MassDOT will extend the Harborwalk by approximately one-half mile along the entire stretch of the Fort Point Channel, closing the last remaining gap in creating a continuous waterfront walkway with seating and landscaping in Downtown Boston. The project includes construction of an approximately one - half mile long new cycle track along Dorchester Avenue that is buffered from traffic and parallel to the newly created pedestrian Harborwalk along the Fort Point Channel. The proposed cycle track will connect with existing bicycle infrastructure and is consistent with future plans by the City, including the South Bay Harbor Trail and the Summer Street Corridor cycle track. The DEIR included a discussion, with existing and proposed conditions graphics demonstrating how public realm improvements will meet Complete Streets Guidelines and provide substantial improvements to pedestrian and bicycle accommodations within the area surrounding South Station.

There are existing Hubway stations in the area on Dorchester Avenue at the end of the South Bay Harbor Trail and on Atlantic Avenue which are anticipated to complement the new cycle track. The project will provide an opportunity to expand Hubway services by creating a second docking location on the east side of South Station. Finally, the new terminal headhouse will include covered, secure bicycle storage facilities.

Traffic Mitigation Measures

The DEIR proposed numerous traffic mitigation measures for build Alternative 1 and Alternatives 2 and 3.

The Proposed roadway mitigation in Alternative 1 includes the following:

- Provide dedicated curbside space for taxicab, passenger drop-off, passenger pick-up, and shuttles along the reopened portion of Dorchester Avenue to address excessive curbside congestion along Atlantic Avenue.
- Remove Atlantic Avenue parking meters. As a near-term mitigation that can be implemented immediately, curbside congestion on Atlantic Avenue would be reduced by eliminating the six parking meters along Atlantic Avenue at Kneeland Street and reprogramming the curb to accommodate drop-off or taxicabs.
- Improve bicycle accommodations on Atlantic Avenue by providing a bicycle lane along the west side of Atlantic Avenue from Kneeland Street to Essex Street.
- Implement intersection upgrades at the following locations to improve traffic flow, reduce queuing, and improve pedestrian and bicycle mobility:

- Atlantic Avenue at Summer Street –implement adjustments to lane assignments and signal timing/phasing. These adjustments include:
  - Restriping the Atlantic Avenue northbound approach, eliminating the shared left-turn/though lane and providing diagonal crossing markings in the intersection;
  - Adding a crosswalk on the westbound approach of the Summer Street/Purchase Street intersection to better accommodate the pedestrian desire line from South Station to Dewey Square;
  - Improving concurrent pedestrian phase timings at Summer Street/Purchase Street intersection to adequately accommodate pedestrians; and
  - Optimizing all intersection signal splits and offsets.
- Purchase Street at Summer Street –add a crosswalk across Summer Street to improve pedestrian crossing.
- Summer Street at Dorchester Avenue – Reopening Dorchester Avenue results in added delays on Dorchester Avenue northbound. Proposed mitigation includes optimizing signal timing and phasing and incorporating bicycle-specific signal equipment, pavement markings, and detection into the intersection layout.
- Surface Road/Essex Street/Lincoln Street – provide additional walk time through pedestrian lead intervals during the concurrent pedestrian phases; install a new crosswalk along the southern east-west crossing from Essex Street to the large median; and optimize the signal timings and splits.
- Congress Street at Dorchester Avenue – optimize signal timing and phasing and increase the pedestrian/bicycle phase to provide adequate clearance time for pedestrians and bicyclists to cross during the exclusive phase.
- Atlantic Avenue at Kneeland Street/Frontage Road/I-90 Off-Ramp – update the MBTA access drive loop detection with the ability to skip the phase if there is no vehicle present and update and optimize intersection phases, splits and offset.
- Dorchester Avenue/West Broadway/Traveler Street – change pedestrian operations to concurrent pedestrian phases, per BTD guidelines and modify the West Broadway westbound approach lane configuration to one left/through and one through/right to better accommodate the vehicle movement onto Traveler Street.
- Dorchester Avenue/West 4th Street – optimize the signal timing splits and offset with Dorchester Avenue/West Broadway/Traveler Street intersection and add concurrent pedestrian walk time.

Alternatives 2 and 3 will require additional roadway mitigation measures to offset the vehicle traffic and parking needs associated with the Joint/Private development. Under these alternatives, all roadway mitigation measures proposed for Alternative 1 will be required, plus the following:

- Implement intersection upgrades at the following locations to improve traffic flow, reduce queuing, and improve pedestrian and bicycle mobility:
  - Atlantic Avenue at Seaport Boulevard – adjust signal timings to improve the Seaport Boulevard approach.
  - Atlantic Avenue at Congress Street – optimize signal timing and phasing.

- Purchase Street at Congress Street – optimize signal timing and phasing.
- Atlantic Avenue at Kneeland Street/Frontage Road/I-90 Off-Ramp – install a new loop detection on the MBTA driveway so driveway phase can be skipped.
- Lincoln Street at the South Station Connector – implement signal timing changes.
- Surface Ramps at the South Station Connector – implement signal timing changes.
- Atlantic Avenue at Congress Street – adjust signal timings to improve the Congress Street approach.
- Atlantic Avenue at Summer Street – adjust and optimize signal timings; eliminate northbound double left conflict.
- Kneeland Street at Lincoln Street - adjust offsets between adjacent intersections for better vehicle progression to minimize queuing.
- Surface Road at Kneeland Street – adjust offsets between adjacent intersections for better progression.

MassDOT has not proposed any traffic mitigation measures at the layover facilities for any of the Build Alternatives, as facility-related traffic trips are expected to be minimal and not contribute to the degradation of intersection traffic.

Transportation Demand Management

The DEIR described the components of a Transportation Demand Management (TDM) program associated with each Build Alternative. TDM measures proposed as part of Alternative 1 include:

- Incorporate bicycle parking in the new headhouse on Dorchester Avenue;
- Construct one-half mile of the Harborwalk adjacent to Fort Point Channel;
- Improve pedestrian connections around and through the South Station site to the neighboring communities of the Leather District, Chinatown, the Downtown/Financial District, and the South Boston Waterfront/Innovation District;
- Provide electronic signage displaying transit schedule information;
- Incorporate curbside space and a shuttle stop for private shuttles along Dorchester Avenue;
- Allow for Hubway to expand its bike share program onto the reopened Dorchester Avenue, and do not preclude an expanded Hubway station in the roadway design phase;
- Work with the City of Boston to improve bicycle accommodations along Atlantic Avenue from Kneeland Street to Summer Street; and
- Participate in the U.S. EPA SmartWay Transport Program to increase energy efficiency and reduce greenhouse gas emissions.

In addition to the TDM commitments proposed in Alternative 1, TDM commitments proposed in Alternatives 2 and 3 include:

- Accommodate electric vehicle charging facilities within the structured parking;

- Charge market rates for off-street parking spaces used by single occupant vehicle (SOV) drivers; and
- Provide car sharing parking (Zipcar or similar program) and carpool/vanpool designated parking spaces in any structured parking facilities.

Monitoring

MassDOT has committed to work with the BTD to conduct a post-development traffic monitoring program. The program will be conducted prior to the start of construction of each phase and repeated six months after the issuance of occupancy certificates.

Air Quality

The project will generate air quality impacts associated with emissions generated by locomotives entering and leaving the South Station terminal and layover facilities, intercity buses from South Station terminal, and vehicular traffic. The DEIR assessed potential project-related air quality impacts utilizing several components: an area-wide impact assessment, which consisted of calculating area-wide project-related pollutant emission inventories; a carbon monoxide (CO) Hot Spot analysis; a particulate matter ($PM_{2.5}$) Hot Spot analysis, an analysis of Mobile Source Air Toxics (MSATs); an assessment of NO_2 concentrations; an assessment of Air Quality Conformity; and an assessment of construction period impacts.[11] MassDOT met with MassDEP prior to the preparation of the DEIR, subsequent to which MassDEP approved the air quality assessment approach for the DEIR. The air quality analysis methodology was comprehensively described in the DEIR.

The DEIR described existing air quality conditions for National Ambient Air Quality Standards (NAAQS) criteria pollutants at the South Station and layover facility sites. The NAAQS, established in conjunction with the federal Clean Air Act (CAA), include ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2) and lead (Pb). Massachusetts is currently in compliance with the 2008 8-hour ozone standard statewide, with the exception of Dukes County. FRA activities must comply with EPA's General Conformity Rule (40 CFR 51 Subpart W). The air quality analysis presented in the DEIR was prepared to demonstrate compliance with the General Conformity Rules.

The DEIR identified project-related criteria pollutants (VOCs, NO_x, PM_{10}, $PM_{2.5}$, CO and SO_2) at the South Station site for a number of scenarios for comparative purposes. These scenarios included:

- 2012 Existing Conditions;
- 2025 No-Build, Alternative 1, and Alternative 3 Conditions; and
- 2035 No Build, Alternative 1, and Alternative 3 Conditions.[12]

[11] MSATs are emitted in both gaseous and particulate form from other vehicles, locomotives, and non-road construction equipment.

[12] MassDOT determined that air quality impacts for Alternative 2 would only be evaluatedif violations were predicted for Alternative 3. Violations are not anticipated, so Alternative 2 was not analyzed.

At the layover sites, MassDOT evaluated impacts relative to the No Build and Build Alternative (i.e., Alternative 1). These scenarios were used for each element of the air quality analysis.

Existing regional emissions were provided by source type (i.e., locomotives, motor vehicles, and buses). The analysis demonstrated that the SSX project will not lead to new exceedances of the NAAQS. Decreases in pollutant emissions in the vicinity of South Station are anticipated between 2012 and 2025 due to significant reductions in EPA-mandated pollutant emission factors. Small increases in pollutant emissions in the vicinity of South Station are anticipated between 2025 and 2035 due to the relatively small reductions attributable to EPA emissions factors and an increase in growth of traffic and train volumes. With the exception of SO_2 emissions (increase of 0.02 tons per year), all evaluated criteria pollutant emissions at the South Station site will decrease between the 2012 Existing Condition and the worst-case 2035 Alternative 3 Condition. The analysis identified small increases in pollutant emissions at the layover facilities due to the project, particularly in locations where no layover facilities currently exist, but these will not lead to exceedances of the NAAQS. No mitigation measures are proposed in conjunction with the Build Alternatives for criteria pollutant impacts.

The DEIR included a CO hot spot analysis in accordance with EPA procedures and in consultation with MassDEP. At the South Station site, this analysis evaluated the worst four study area intersections based on LOS analysis, total traffic volume, and geographic coverage. The single worst-case intersection was evaluated for each layover site. All of the studied intersections currently experience maximum 1-hour and 8-hour CO concentrations below corresponding federal and State standards in the existing condition and all future development alternatives. The analysis predicted decreases in CO concentrations in the No Build and Build Alternatives compared to existing conditions due to the projected decrease in motor vehicle CO emissions rates. No mitigation measures are proposed at any of the study area traffic intersections for CO impacts.

A $PM_{2.5}$ hot spot analysis was conducted following EPA's December 2010 guidelines and focused only on the emissions from diesel trains and motor vehicles. The results of this analysis indicated that all modeled 24-hour and annual $PM_{2.5}$ concentrations were well below National and Massachusetts $PM_{2.5}$ standards in all years and alternatives evaluated.

The DEIR air quality analysis consisted of a qualitative comparison of potential project-related MSATs developed using estimates of VOCs and $PM_{2.5}$ emissions as a MSAT surrogate for each SSX alternative. This analysis concluded that in 2025 and 2035, MSATs in Alternative 1 would increase just over 2 percent from the No Build Alternative and MSATs in Alternative 3 would increase just over 4 percent from the No Build Alternative.

According to the DEIR, the project area and the entire state of Massachusetts, is in attainment of the NO_2 standards; therefore, a modeling analysis for NO_2 is not required for this project. However, in response to the scope, the DEIR completed a localized impact assessment of NO_2 emissions using dispersion modeling to disclose potential harmful health effects of transportation-related pollutants emitted by the increase in rail operations due to the increase in the number of railroad tracks at South Station. The analysis concluded that all of the modeled 1-

hour and annual NO_2 concentrations were well below the National and Massachusetts NO_2 standards for all future years and alternatives evaluated.

MassDOT evaluated the potential impacts of diesel particulate matter (DPM) and ultrafine particles (UFPs) in association with the project. According to the DEIR, there are no regulations for either pollutant at the federal or State levels which contain air quality standards, and sufficient data are not available to accurately conduct a quantitative assessment of emissions from the project alternatives. Instead, the DEIR included a qualitative assessment of DPM and UFP emissions in the vicinity of South Station. DPM emissions are anticipated to follow trends of $PM_{2.5}$ emissions from diesel fueled sources. Using $PM_{2.5}$ emissions as a proxy, for each project year Alternative 1 is predicted to produce more DPM emissions than the No Build Alternative and Alternative 3 is predicted to produce more DPM emissions than both the No Build Alternative and Alternative 1. To assess potential impacts from UFPs, the DEIR used fuel consumption in the vicinity of South Station as a surrogate. Similar to DPM emissions, for each project year Alternative 1 is predicted to produce more DPM emissions than the No Build Alternative and Alternative 3 is predicted to produce more UFP emissions than both the No Build Alternative and Alternative 1.

The DEIR described emissions from locomotives and the potential use of locomotive technologies to provide additional air quality benefits to the region or layover and station facilities on a localized level. For the purposes of this assessment, MassDOT assumed that all MBTA trains on the South Coast Rail line and Amtrak trains on the NEC route (Acela and regional) are electric, and all other MBTA commuter rail trains and Amtrak trains on the Inland and Lake Shore Limited routes are diesel powered.

According to the DEIR, EPA's Locomotive Exhaust Emission Standards set upper limits for pollutant emissions based upon the date a locomotive engine is manufactured or remanufactured. These standards limits are categorized in Tiers, with Tier 0 applying to engines manufactured between 1973 and 1992; Tier 1 applying to engines manufactured between 1993 and 2004; Tier 2 applying to engines manufactured between 2005 and 2011; Tier 3 applying to engines manufactured between 2012 and 2014; and Tier 4 standards applying to engines manufactured in 2015 or later. The 2012 Existing Conditions scenario assumed that the typical MBTA locomotive (a F40PH-2C) is in compliance with Tier 1 standards and the typical Amtrak locomotive is in compliance with Tier 0 standards.[13] The 2025 and 2035 No Build and Build Alternatives assumed that all locomotives are in compliance with Tier 4 standards. This assumption is based on MBTA and Amtrak fleet management plans indicating that the existing fleets will be replaced or rebuilt by 2025 and required to meet Tier 4 standards. Between Tier 1 and Tier 4 emissions reductions are estimated at 82 percent for NO_x, 96 percent for PM, and 75 percent for hydrocarbons.

Amtrak trains along the NEC are electrified; existing MBTA trains and Amtrak inland routes continue to run on diesel. MassDOT is not planning any system-wide electrification processes now or in the foreseeable future (with the potential exception of the current Preferred Alternative for the SCR project) due to current financial and logistical limitations. However, the project will not preclude the possibility of installation of electrified rail, as the project will

[13] This assumption is based on the diesel locomotives that run on the Lake Shore Limited route. The NEC is electrified.

include clearance and right-of-way designs that will accommodate future electrification infrastructure. Plug-in facilities (shore power) are currently in place at Readville Yard-2. MassDOT will incorporate plug-in facilities at all proposed layover facilities.

Noise and Vibration

The DEIR included a noise and vibration study performed in accordance with the FTA's *Transit Noise and Vibration Impact Assessment* guidance manual. In addition to federal noise and vibration criteria, the DEIR also used the City of Boston Noise Ordinance to assess potential construction period noise impacts. Construction period impacts are discussed in greater detail later in this Certificate. MassDOT collected existing noise levels at the South Station and layover facility sites for both residential and non-residential sensitive receptors and described the primary sources of existing noise (e.g., current layover operations, commuter rail service, etc.).

The DEIR compared predicted noise levels at each noise-sensitive receptor location in the 2035 Build Alternatives with the FTA noise criteria and the estimated change (i.e., increase or decrease) in peak hour noise levels between 2013 and 2035. Train operations were assumed to be the same for all three 2035 Build Alternatives (Alternatives 1, 2, and 3); train operations noise modeling results for Alternative 1 were used in the noise assessment for Alternatives 2 and 3. To determine train-related noise, MassDOT considered train operations by type (diesel or electric locomotive powered), time of day, trainset sizes, location by track number, the presence of intervening noise barriers of buildings, and ground attenuation effects. The analysis indicated that noise impacts from Alternative 1 will occur at a receptor location across the Fort Point Channel (at Necco Street, approximately 950 feet away from the nearest track). The DEIR concluded that due to the removal of the USPS facility, a direct sound propagation path will be created to this sensitive receptor, exceeding the FTA moderate impact criteria. The analysis also identified a moderate impact to 245 Summer Street during the peak-hour noise level (Leq) due to an increase in idle time for Amtrak locomotives at the north end of the station near the building. The joint/private development projects in Alternatives 2 and 3 are expected to entirely enclose the station area and thereby eliminate potential noise impacts to 245 Summer Street and Fort Point Channel. Noise levels inside South Station may increase by 3 to 5 dBA in the 2035 Alternatives 2 and 3, depending on the reverberation characteristics of the enclosed space.

The potential noise impacts at the layover facilities were modeled using a worst-case scenario assuming that all added trains (e.g., 30 trainsets at Widett Circle and 8 trainsets at Readville Yard 2) arrive or leave the facility during the same midday peak hour. Noise impacts at Widett Circle are not projected to exceed FTA criteria as the nearest noise sensitive receptors located along Albany Street are approximately 1,300 feet from the acoustic center of the site. Midday peak hour noise levels at Readville Yard 2 are expected to exceed the FTA moderate impacts criterion at identified residential receptors on Wolcott Street and Riley Road.

The DEIR identified potential noise mitigation measures for the South Station site in Alternative 1 and at Readville Yard 2. At South Station under Alternative 1, MassDOT would install a noise barrier between the easternmost track and Dorchester Avenue to reduce the day-night average sound level (Ldn) across the Fort Point Channel. This noise barrier will be constructed to extend at least three feet above the height of the locomotives to reduce noise

levels by approximately 10 A-weighted decibels (dBA). A noise barrier will also be installed between the building at 245 Summer Street and the train station to reduce the peak-hour Leq levels. At Readville Yard 2, MassDOT will extend the existing noise barrier and berm between the layover facility and Wolcott Street to include the layover facility expansion area. The noise barrier will also be extended to provide noise mitigation to the apartment buildings along Riley Road.

Existing conditions vibration measurements were obtained at four locations at the South Station site: the South Station headhouse; the east side of South Station near Track 13; the west side of South Station near Track 1; and at 245 Summer Street, a building immediately adjacent to the site that operates vibration-sensitive computer equipment in its basement. FTA surface vibration curves were used to predict ground-borne vibration and ground-borne noise levels from transit operations. According to the DEIR, because of the slow speeds at which trains operate when entering and leaving South Station (10 mph or less), typical vibration levels are below the FTA impact criterion of 72 velocity decibels (VdB) for human annoyance. MassDOT conducted a detailed indoor and outdoor vibration measurement assessment at 245 Summer Street using enhanced vibration-monitoring equipment for measuring indoor vibration levels. This analysis identified vibration levels below 60 VdB at a distance of 75 feet from the closest track. These levels are below the FTA outdoor criterion of 65 VdB for buildings with vibration-sensitive equipment. The interior vibration measurements indicated that existing vibration adjacent to the sensitive equipment is due to the mechanical equipment located in the basement and not the trains at South Station. Similar to South Station, trains entering and exiting the layover facilities will operate at low speeds. Therefore, no vibration measurements were conducted at the proposed layover facilities. Potential vibration impacts associated with track switches and crossovers are not anticipated at Widett Circle and Readville Yard 2, as nearby residential receptors are located greater than 130 feet from the switches and thereby assumed to meet the FTA vibration criteria.

Greenhouse Gas Emissions

The DEIR included a GHG analysis prepared in compliance with the MEPA Greenhouse Gas Policy and Protocol ("the GHG Policy"). The GHG Policy requires projects to quantify carbon dioxide (CO_2) emissions and identify measures to avoid, minimize or mitigate such emissions. The GHG analysis quantified the direct and indirect CO_2 emissions associated with the project's energy use (stationary sources) and transportation-related emissions (mobile sources). The GHG analysis estimated stationary source emissions for two project alternatives; Alterative 1 – Transportation Improvements Only and Alternative 3 – Joint/Private Maximum Build.

The GHG analysis evaluated CO_2 emissions for two scenarios as required by the Policy including 1) a Baseline Case and 2) a Mitigation Case. The Baseline Case is designed to meet the Massachusetts Building Code, 9th Edition, with amendments (2012 International Energy Conservation Code (IECC), ASHRAE 90.1-2010), while the Mitigation Case contains energy efficiency design measures in order to meet the anticipated revisions to the Stretch Energy Code

(Stretch Code) as it may be amended in mid-2015 or later.[14] MassDOT met with staff from the MEPA office and the Department of Energy Resources (DOER) prior to performing the GHG analysis to confirm modeling assumptions and methodology and provide clarity on the DEIR scope.

As noted in the DEIR, the City of Boston has adopted the Stretch Code subsequent to its designation as a Green Community under the provisions of the *Green Communities Act of 2008*. Therefore, the project will be required to meet the applicable version of the Stretch Code in effect at the time building permits are sought. The Stretch Code increases the energy efficiency code requirements for new construction (both residential and commercial) and for major residential renovations or additions in municipalities that adopt it. Compliance with the Stretch Code is demonstrated through modeling of energy use for larger buildings, while smaller buildings (less than 100,000 sf) may follow a selected set of "prescriptive" requirements for particular energy efficiency measures. MassDOT intends to meet Stretch Code requirements for the layover facility sites through prescriptive energy measures. As such, no modeling was included in the DEIR.

Direct stationary source CO_2 emissions include those emissions from the facility itself, such as boilers, heaters, and internal combustion engines. Indirect stationary source CO_2 emissions are derived from the consumption of electricity, heat or other cooling from off-site sources, such as electrical utility or district heating and cooling systems. Mobile CO_2 emissions include those emissions associated with vehicle use by employees, vendors, customers and others, and in the case of this project, diesel trains. The GHG Policy requires proponents to use energy modeling software to quantify projected energy usage from stationary sources and energy consumption and mobile source modeling software to predict transportation-related emissions. MassDOT used eQUEST modeling software to assess stationary source emissions and data gathered in conjunction with the study area air quality analysis to determine mobile source CO_2 emissions from locomotives, automobiles/trucks and buses. Emissions factors for automobiles, buses and trucks were determined from references cited in the GHG Policy. Fuel consumption and emissions rates for locomotives were obtained from EPA's *Locomotive Emissions Standards* EPA-420-R-98-101 (April 1998).

The DEIR provided a general summary of proposed building mitigation measures, mostly focusing on HVAC, lighting, envelope and process categories for the various types of proposed uses (e.g., terminal expansion, hotel and multi-family high-rise. The current preliminary project design does not include modifications to, or ventilation connection with, the existing South Station facilities. The stationary source GHG analysis estimated project-related CO_2 emissions at the South Station site as follows:

- Alternative 1 Baseline = 2,387 tons per year (tpy);
- Alternative 1 Mitigated = 2,192 tpy;
- Alternative 3 Baseline = 7,634 tpy; and
- Alternative 3 Mitigated = 6,736 tpy

[14] MassDOT anticipates that a new Stretch Code (SCII) will be proposed, effective mid-2015 or later. It is anticipated that SCII will require energy use to be between 12 and 15 percent below the baseline of the 2012 IECC requirements.

The reductions in Alternative 1 between the Baseline and Mitigated Conditions were estimated at 195 tpy, or 8.2 percent. The reductions in Alternative 3 between the Baseline and Mitigated Conditions were estimated at 898 tpy, or 11.8 percent. These estimates do not include the potential GHG benefits of renewable energy sources, discussed in further detail later in this section of the Certificate.

The DEIR indicated that depending upon final ownership arrangements, MassDOT may lease space to tenants. In this case, certain energy efficiency measures and operational practices may be implemented during tenant fit-out rather than as part of MassDOT's core and shell design. Tenants would require City of Boston permits for fit-out and will therefore be required to comply with the applicable Stretch Code provisions. The DEIR included a conceptual Tenant Manual with recommendations and requirements for tenant fit-out. The Tenant Manual will require or encourage a commercial tenant to:

- Use variable frequency drives in HVAC distribution systems;
- Reduce lighting power densities in office spaces below Code;
- Design electric wiring and systems compatible with the application of Energy Management Systems and automated lighting controls;
- Use EnergyStar-rated appliances, if available;
- Participate in the state-wide Green Initiatives Recycling Program;
- Implement recycling of construction waste; and
- Promote employee participation in the TDM program.

The DEIR included a calculation of the Energy Use Index (EUI) using United States Energy Information Administration (EIA) Commercial Buildings Energy Consumption Survey (CBECS) EUI values as a benchmark for the EUI resulting from modeling both the Base Case and Build with Improvements scenarios. The DEIR compared the modeled building's EUI to those averages presented in the CBECS. Baseline and Mitigated Case EUIs were generally better than the CBECS averages, with the exception of the terminal building. This discrepancy is most likely due to operational differences between the terminal building and the "public assembly" category identified in the CBECS.

The GHG analysis also evaluated the potential use of on-site renewable energy sources such as wind power, solar or photovoltaic (PV) panels, ground-source heat pumps (GSHPs), district steam energy, and combined heat and power (CHP). Wind turbines and GSHPs were dismissed as potential energy sources for the project due to airspace or below ground conflicts. The DEIR also noted that installation of significant amounts of on-site electric generating capacity may not be feasible due to likely electrical connections through spot networks rather than a radial distribution system. If South Station were served by spot network vaults, any interconnected distributed energy source would be limited to $1/15^{th}$ of the minimum facility load to prevent excess power from flowing into the network and tripping the network protectors in the vault. This type of connection would also require use of inverter-based equipment. The DEIR concluded that a spot network would preclude all but the smallest on-site CHP systems and would limit PV systems.

A PV capacity analysis was completed using shadow data collected for the South Station site. This shadow analysis identified approximately 70,000 sf of available roof space for solar panel in Alternative 1 and 25,000 sf of available roof space in Alternative 3. The PV capacity analysis assumed that 50 percent of these total roof areas will be impacted by shadows, reducing the effective area available for panel placement to 35,000 sf in Alternative 1 and 12,500 sf in Alternative 3. Alternative 1 could accommodate a 420-kW system (an annual output of 462 MWh), while Alternative 3 could accommodate a 150-kW system (an annual output of 165 MWh). The analysis estimated potential GHG savings and financial feasibility for each PV system assuming both third-party and MassDOT-owned ownership models and State and federal incentives. Third party ownership modeling was determined to be more favorable with shorter payback periods (8 or 9 years). Estimated GHG reductions include 166 tpy in Alternative 1 and 59 tpy in Alternative 3. The PV analysis also estimated thermal generation capabilities for solar hot water (SHW) heating. Alternative 1 was estimated to generate about 42,000 therms per year, offsetting 245 tpy of CO_2, while in Alternative 3, a thermal PV system could generate about 15,000 therms per year, offsetting approximately 88 tpy of CO_2.

The DEIR also identified potential GHG reductions associated with connecting South Station to the existing Veolia district energy system. Steam heat from the facility could be used for domestic hot water production year-round, for building heat during the cooling season, and for power steam-driven absorption chillers for summertime air conditioning. The DEIR noted that using steam from this facility to reduce GHG emissions would be dependent upon the source of steam and the extent of energy losses associated with transmission from Veolia's Kneeland Street Plant and South Station. Veolia uses both CHP systems and conventional boilers to generate steam in this district energy system, the source of which could either provide CO_2 savings or incur a higher CO_2 burden. MassDOT will continue to evaluate renewable energy sources in the FEIR.

The DEIR included a quantification of estimated GHG impacts associated with water and wastewater conveyance and treatment for Alternative 3, the worst-case scenario for development of South Station. In Alternative 3, water-related GHG emissions were estimated at 11.9 tpy and wastewater-related GHG emissions were estimated at 70.3 tpy. Water and wastewater-related GHG emissions for the layover facilities were not calculated per the GHG Policy, as they will not generate flows in excess of 300,000 gpd.

Mobile Sources

Mobile source emissions were evaluated impacts from all transportation sources in the immediate South Station area and locomotive impacts from travel to and from the layover facility sites. The South Station area assessment estimated CO_2 emissions associated with motor vehicles and buses on affected roadways within the project study area and railroad locomotives entering, idling, and leaving South Station in the 2012 Existing Condition, 2025 and 2035 No Build Conditions and 2025 and 2035 Build Condition for Alternatives 1 and 3. These emissions were summarized by type (i.e., locomotives, motor vehicles, intercity buses, and total). The DEIR described various assumptions regarding locomotive type, schedules, throttle notch and fuel rates incorporated into the analysis. I note that the GHG analysis did not tabulate indirect

emissions from Amtrak's electric locomotive service. The FEIR will be required to evaluate these impacts.

The locomotive impacts traveling to and from the layover facilities to the Tower 1 Interlocking were estimated for the 2012 Existing Condition, the 2025/2035 No Build Alternatives and the 2025/2035 Build Alternatives.[15] Layover facility operations were assumed to remain unchanged between 2025 and 2035. The DEIR presented assumptions related to train operations, idling times, and trip length to determine CO_2 emission from both idling and moving trains.

The DEIR also provided net project-related local emissions estimates for 2035 Build Alternatives 1 and 3 and compared project-related emissions to the 2035 No Build Alternative by type (i.e., motor vehicles near South Station, intercity buses near South Station, locomotives near South Station, and locomotives to/from layover sites). These net project-related CO_2 emissions were estimated at 15,467 tpy for Alternative 1 and 15,679 for Alternative 3. These results indicate that the bulk of emissions are generated from trips to and from the layover facilities, with modest reductions (733 tpy) achieved by SSX itself due to reduced congestion and idling time. Emissions totals do not account for the use of electric plug-in facilities which will further reduce locomotive idling emissions and proposed roadway intersection improvements which will reduce vehicle idling and congestion.

Sustainability

The DEIR provided an overview of MassDOT's GreenDOT Policy, a policy designed to promote sustainable economic development; protect the natural environment, and enhance the quality of life in the Commonwealth. Many of the sustainability measures proposed in accordance with the project, including the project's ability to enhance transit service will contribute to reductions in GHG emissions and further the Commonwealth's efforts mandated by the Global Warming Solutions Act and the Commonwealth's transportation mode share goals. The DEIR summarized the project elements' (i.e., headhouse, terminal tracks, Dorchester Avenue, and layover facilities) consistency with the GreenDOT implementation plan.

Historic and Archaeological Resources

The DEIR included an evaluation of the impact of the SSX project on historic architectural and archaeological resources. According to the DEIR, the evaluation of existing conditions and related assessments were conducted in conjunction with the Massachusetts State Historic Preservation Office (SHPO)/MHC, in accordance with Section 106 of the National Historic Preservation Act of 1966 (36 CFR Part 800), as amended, the implementing regulations of the Advisory Council on Historic Preservation (36 CFR 800), and State Register Review procedures (950 CMR 71.00).

In accordance with Section 106, MassDOT established Areas of Potential Effects (APEs) for the South Station site and each proposed layover location. As noted in the DEIR, following

[15] These estimates include trips to all three layover facilities, Widett Circle, BPY and Readville Yard 2 in a worst case scenario (i.e., 30 trains using Widett Circle, 20 trains using BPY, 18 trains (8 new) using Readville Yard 2).

its review of the technical report prepared for the project – *Historic Architectural Resources Technical Report* (October 2014) - MHC concurred with the identification and evaluation of findings, including the APEs.

The DEIR listed historic resources within the South Station APE and noted whether they were listed in the National and/or State Registers of Historic Places (the Registers) or included in the *Inventory of Historic and Archaeological Assets of the Commonwealth* (the Inventory). The following resources are listed on the Registers:

- Fort Point Channel Historic District;
- Leather District;
- Russia Wharf Buildings; and
- South Station Headhouse.

The Commercial Place Historic District and the Fort Point Channel Landmark District are listed in the State Register of Historic Places. The following resources are listed in the Inventory:

- Chester Guild, Hide and Leather Machine Company;
- Chinatown District;
- Federal Reserve Bank of Boston;
- Kneeland Street Steam Heating Plant;
- South End Industrial Area;
- Keystone Building;
- Weld Building;
- USPS General Mail Facility/South Postal Annex;
- MBTA Operations Center Power Substation;
- 245 Summer Street; and
- Gillette.[16]

The DEIR noted whether or not properties listed on the Inventory were recommended as National Register-eligible.

The Widett Circle and Readville Yard 2 APEs do not contain historic buildings or structures listed in the Registers. The Widett Circle APE also does not contain any properties listed in the Inventory. A portion of the Readville Yard 2 APE is located within the Readville Industrial Survey Area, which contains two properties listed in the Inventory: Standard Oil Company Depot Complex and Frank Kunkel & Son Hammered Forgings. Previous evaluations of these properties were not recommended as being eligible for the National Register.

The DEIR discussed potential project-related noise and vibration impacts to historic architectural resources. This assessment was expanded in the South Station APE to include potential shadow, wind, and visual impacts. At Widett Circle train operation noise impacts are

[16] The Gillette facility had not been previously surveyed, but MassDOT prepared an inventory form as part of the historic architectural technical report.

predicted to be below FTA impact criteria, construction period noise levels are predicted to not exceed FTA construction noise limits and new vibration will not impact historic properties. Noise impacts are predicted to occur at residences along Wolcott Street and Riley Road, but these impacted properties are not identified as historic properties. Construction period noise levels are not predicted to exceed FTA construction noise limits and new vibration at each site will not impact historic properties within the APE.

Impacts to historic architectural resources associated with the project may be unavoidable. MassDOT will continue to work with MHC and interested parties, such as the Boston Landmarks Commission, to develop appropriate mitigation measures to minimize or mitigate impacts to historic resources.

The DEIR included an assessment of potential impacts to historic resources in the South Station APE for each development alternative (Alternatives 1, 2, and 3). Potential noise, vibration and shadow impacts and proposed mitigation were described previously in this Certificate. The assessment concluded that no adverse visual impacts on historic architectural resource are expected under any development alternative.

MassDOT established archaeological APEs in accordance with Section 106 for the South Station and layover facility sites. The boundary of the APEs for archaeological resources is limited to the area of direct impact for construction activities. MassDOT conducted archival research and a visual field survey to locate and identify visible archaeological sites and sensitive areas where potentially significant belowground resources may be present and affected by the project. This information was used to establish sensitivity rankings (low, moderate, and high) within the SSX archaeological APEs. According to the DEIR, areas assigned moderate or high sensitivities are typically subjected to subsurface testing as part of an intensive (locational) archaeological survey to locate and identify potentially significant sites. The DEIR concluded that given the historic disturbance and use of each APE, assignment of archaeological sensitivity rankings were not warranted. MassDOT recommended no further archaeological investigations associated with the SSX project.

Hazardous Materials

The DEIR provided a summary of potential contamination and hazardous materials issues associated with the South Station and layover facilities sites. The DEIR indicated that MassDOT anticipates encountering some form of contamination as part of project construction given the historic uses within the project area. MassDOT reviewed MassDEP files for assigned Release Tracking Numbers (RTNs) under the Massachusetts Contingency Plan (MCP) (310 CMR 40.0000). The DEIR identified 22 instances of historic release or threat of release into the environment at the South Station site; all RTNs have achieved closure. The DEIR described each RTN and remedial action outcomes (RAOs) and the presence of Memoranda of Understanding (MOUs) or Activity and Use Limitations (AULs). The DEIR acknowledged that initial evaluation of the USPS facility identified the presence of asbestos-containing material (ACM) and other potential sources of hazardous material (e.g., lead paint, mercury-containing equipment, etc.) The DEIR identified 14 instances of historic release or threat of release into the environment at the Widett Circle site; all RTN's have achieved closure. None of the RAOs have

AULs associated with them. Site evaluations of the buildings at Widett Circle have yet to be completed. Finally, the DEIR identified two instances of historic release or threat of release into the environment at the Readville Yard 2 site. One RTN has been closed, while the other, RTN 3-15991, remains open. Site evaluations of the buildings at Readville Yard 2 have yet to be completed.

The open RTN has achieved a Class C-2 RAO, indicating that a condition of No Substantial Hazard exists, but response actions to achieve a Permanent Solution are feasible and required. While this RTN is generally located east of the proposed layover facility, the DEIR indicated that portions of the release site extend onto MBTA/Commonwealth of Massachusetts-owned property. An AUL is proposed that would require maintenance of a geotextile and gravel cover to address residual lead and PCB soil contamination. The proposed remedy may require approval from the EPA. The DEIR noted that site remediation would be an alternative to placement of an AUL on-site.

Construction activities at BPY and Readville Yard 2 could require remediation in compliance with the MCP. The Readville Yard 2 work will require oversight from a Licensed Site Professional (LSP) in conjunction with the Soil Management Plan.

Construction Period

The DEIR described potential construction period impacts associated with the SSX project and outlined proposed mitigation measures to be implemented during the project's construction staging and sequencing. As the project will be undertaken while maintaining rail service to South Station, MassDOT will coordinate rail-related construction activities with the operating railroads including the MBTA and its commuter rail operator, Amtrak, and CSXT. Non-rail-related construction activities will be coordinated with the City of Boston, utility companies, and other public and private entities as necessary. MassDOT envisions that the design of the joint development will be prepared by a private developer, and thus construction-related impacts associated with this portion of the project were not included in the DEIR.

The DEIR included a draft Construction Management Plan (CMP), a draft Construction Waste Management Plan (CWMP) and a potential construction schedule identifying timeframes and durations for various stages of construction activities. The construction schedule assumed the construction of the SSAR project concurrent with the demolition of the USPS facility, with its completion prior to SSX construction. The DEIR described a general construction sequencing plan, with anticipation that construction work at the South Station site and the layover facility sites could advance independently. The layover facility construction is expected to have minimal impact on train operations. The DEIR identified an opportunity to investigate coordination and combination of rail systems' planned maintenance activities with the proposed construction activities to minimize disruptions to train operations.

The DEIR described potential construction period air quality, noise and vibration, site contamination and hazardous material, and utility impacts. The DEIR discussed the proposed content of a CMP designed to include measures to avoid, minimize, and mitigate these aforementioned construction period impacts. The CMP will include construction traffic

management plans (TMPs) for each work zone, prepared in coordination with BTD, to ensure safe vehicular, bicycle, and pedestrian access to South Station and manage traffic within the project study area. The CMP will also include an emissions control plan to address impacts associated with fugitive dust and construction equipment and vehicle exhaust. The DEIR identified potential BMPs and mitigation measures that may be used by the contractor to manage construction-related emissions.

The demolition and construction activity associated with the project is expected to impact the building at 245 Summer Street and the South Station headhouse. While the DEIR indicated that these noise levels are not anticipated to exceed FTA construction noise limits, they are expected to exceed the City of Boston's construction noise limits. Vibration levels are not expected to result in structural damage to nearby buildings, but may exceed FTA human annoyance criterion. A Noise Control Plan will be incorporated into the CMP that includes construction period noise monitoring to determine compliance with FTA and the City of Boston noise limits and methods to mitigate construction-related noise levels, if necessary (e.g. noise barriers of appropriate height, length and location). Vibration measures will be obtained inside the building located at 245 Summer Street to ensure that construction equipment vibration levels do not exceed vibration-sensitive equipment specifications. The DEIR identified a variety of additional noise and vibration control BMPs that may be selected by the contractor.

During construction, dewatering may be required if groundwater is encountered during excavation or if surface water ponds in temporary BMPs or other areas. MassDOT will obtain appropriate permitting approvals from MWRA, MassDEP, or BWSC, as necessary to ensure proper management and disposal of dewatering effluent. MassDOT acknowledged the presence of a BWSC CSO under the USPS facility, indicated that it will employ BMPs to maintain the structural integrity and provide outlet protection of this CSO, including access for continued inspection and maintenance.

Construction at South Station and each layover facility site will require the preparation of a Stormwater Pollution Prevention Plan (SWPPP) in accordance with NPDES Construction General Permit requirements. The SWPPP should identify potential pollutant sources and describe BMPs to be employed for erosion and sedimentation control, temporary stormwater management, dust control, and site stabilization consistent with MassDEP's *Stormwater Handbook* (2008) and MassDOT's *Stormwater Handbook for Highways and Bridges* (2010).

MassDOT will develop contract specifications to ensure consistency with MassDOT's GreenDOT Implementation Plan requirements and project sustainability goals. The DEIR identified the following potential sustainability contract specifications: green fleet encouragement, temporary wood reuse, material purchase location and logistics, recycled paving materials, low-emitting materials, and pest management. Other recycling initiatives may include reuse of granite, recycled content in track-work items, use of reclaimed material, use of alternatives to Portland Cement, and/or use of recycled steel items. Contract specifications will also be developed requiring monitoring and proper utilization of water in the construction process, including measures to minimize losses and encourage reuse. Recycle and recovery apparatus will be required for operations such as dewatering, slurry installations, and drilled caissons.

The project will require the preparation of a CWMP. The project will generate a variety of solid waste associated with building demolition, new and modified track work, and building construction. During preliminary design, MassDOT will conduct a Hazardous Building Material Evaluation at each SSX project site to identify any recognized hazardous building materials. MassDOT will include specifications in project contracts addressing the handling and disposal of asbestos and asphalt, brick and concrete (ABC) in accordance with MassDEP regulations. MassDOT intends to evaluate all materials that leave SSX project site for possible reuse or recycling capabilities, the potential hazardous nature of the material, and final disposal location in accordance with MassDEP regulations. The construction contracts will contain requirements for contractors to maximize the amount and value of materials recovered from the construction and demolition site, including implementing source separation, deconstruction, and other material reuse practices. These contract documents will be written to comply with the goals of the *Massachusetts Solid Waste Plan.*

MassDOT will conduct Phase 1 Environmental Site Assessments (ESAs) at the South Station and layover facility locations. Pending the results of these Phase 1 ESAs, Phase II subsurface investigations may be required to evaluate subsurface contamination and inform the final construction period protocols for managing oil and hazardous materials (OHM), including compliance with the Massachusetts Contingency Plan (MCP) regulations (310 CMR 40.0000).

SCOPE

General

The FEIR should follow Section 11.07 of the MEPA regulations for outline and content, as modified by this scope. The FEIR need not duplicate information provided as part of the DEIR if it remains unchanged as part of the final project presented in the FEIR or is not critical to the evaluation of scope items identified below.

A primary purpose of the scope of the DEIR is to identify alternatives for analysis. Several comments request that the scope for the FEIR be expanded to include additional alternatives that would represent a significant increase in the scope of review and incur substantial additional costs for design, permitting and construction (i.e., study relocation of the headhouse to 245 Summer Street or require MassDOT to advance the NSRL). I decline to expand the scope of the FEIR to incorporate these requests.

Project Description and Permitting

The FEIR should include a detailed description of the project and describe any changes to the project since the filing of the DEIR. The FEIR should include updated site plans, if applicable, for existing and post-development conditions at a legible scale (80-scale or larger) for the South Station Site, Widett Circle and Readville Yard 2. These conceptual plans should include not only on-site work, but any proposed off-site work associated with transportation improvements. The FEIR should include plans at a legible scale clearly depicting each C.1 C.2

interlocking (Interlocking 1, Cove and Broad) that will be modified as part of SSX. These graphics should depict existing conditions at each interlocking, environmental or property ownership constraints that may influence their final design, and proposed modifications to trackwork. The FEIR should discuss how the preferred interlocking design will eliminate or reduce delays in a scenario where a locomotive becomes disabled within its trackwork. C.3

If updated ridership projections are available, the FEIR should summarize these changes and discuss how they may affect the overall project. The FEIR should address comments regarding the perceived discrepancy between increases in track layout capacity and future ridership projections. C.4

I note that the No Build and each Build Alternative evaluated in the DEIR assumed the construction of the SSAR project. It is unclear how the project design may be impacted if SSAR does not proceed prior to construction of SSX. The FEIR should include a discussion of how platform lengths, headhouse and concourse circulation and access from the surrounding neighborhood may be altered and how this may affect final project design. C.5

As noted previously, the environmental impacts associated with the BPY layover facility will be reviewed in conjunction with the I-90 Allston Interchange project (EEA # 15278). The FEIR should include an update on the status of this project's funding, design, and MEPA review. C.6
If the I-90 Allston Interchange project does not advance in a timely manner and MassDOT wishes to commence use of BPY in a manner beyond that specifically authorized in its agreement with Harvard University, a Notice of Project Change (NPC) may be required for the SSX project. C.7

The FEIR should include an updated discussion of permitting requirements associated with the project and how the project will be constructed in accordance with applicable regulatory performance standards. C.8

Alternatives

The FEIR must include a selection of a Preferred Alternative. This Preferred Alternative should include both South Station improvements (i.e., platforms and track layout, interlocking upgrades, conceptual headhouse design, Dorchester Avenue improvements, and bicycle, pedestrian and intersection improvements) and selected layover facility locations. The FEIR should include the results of the Tier 2 terminal track configurations screening alternatives. The FEIR should describe each modeled alternative, how it will meet Amtrak and the MBTA's future service plans, meet project OTP and delay goals, and allow parallel moves between Tower 1 Interlocking and the terminal. These alternatives should be evaluated based on their impacts to existing infrastructure, construction staging, capital and maintenance costs, and operations with respect to accommodating and coordinating with other SSX project elements, including the station and midday layover facilities, and the SSAR project. The FEIR should clarify how freight operations were incorporated into the evaluation of future service plans and access to and from the layover facilities. C.9 C.10 C.11 C.12 C.13

The FEIR should also include an assessment of platform capabilities and berthing abilities, including the number of platforms accessible to each track. The FEIR should note if platforms will not meet established MBTA and Amtrak requirements for longer trainsets. If these standards cannot be met, the FEIR should identify which tracks and platforms will be affected and how this may impact future operations and service capabilities. MassDOT should provide an additional analysis of innovation mechanisms to extend platform lengths. The FEIR should identify which tracks/platforms may implement these techniques and estimated extension lengths. Selection of these techniques should be coordinated with project stakeholders, the FRA, Amtrak and the MBTA. C.14 C.15

The FEIR should include a preferred South Station design alternative. The FEIR should describe how the conceptual design is consistent with MassDOT's station design principles, project purpose and need, and established performance objectives. The FEIR should also present a preferred joint/private development alternative, based upon ongoing financial and real estate feasibility analyses. C.16

The FEIR should include an expanded assessment of preferred layover facility operations based upon various combinations and capacities at Widett Circle, BPY, and Readville Yard 2 to support the selection of a Preferred Alternative that meets the project's layover needs. This Preferred Alternative should be informed by the screening analysis, potential environmental impacts, and system operational requirements. This layover facility alternatives analysis should consider how each potential facility will operate and meet expected operational needs either individually or in conjunction with other proposed facilities once integrated into the larger rail system (Amtrak, MBTA, freight) that connects to South Station. The FEIR should specifically address how the location and operations at any of the potential layover facility sites will impact Main Line services for Amtrak, the MBTA and freight services due to necessary train dead-heading and midday storage requirements. The FEIR should also clearly identify proposed maintenance or other rail-related operations that will be undertaken at each layover yard. These activities, and their potential environmental impacts (e.g., industrial wastewater generation, noise impacts), should be accurately reflected in the environmental analyses prepared by MassDOT. The FEIR should clarify is these activities were assumed in the DEIR, and if not, revise analyses accordingly in the FEIR. C.17 C.18 C.19

The FEIR should include a phasing plan that addresses sequencing and timing of the potential layover facility sites based on operational need. This analysis should consider what available storage capabilities are presently afforded, or could be implemented in a No Build Alternative, to MassDOT at these facilities, noting that use of the layover facility at BPY is subject to an agreement with Harvard University. C.20

I note that the DEIR indicated that public outreach to the residents surrounding the Readville Yard-2 layover facility has yet to be undertaken. MassDOT, in a collaborative effort with the City of Boston, should expand its public outreach specifically to these residents prior to selection of a Preferred Alternative. I expect that the City of Boston will assist MassDOT in facilitating these efforts. Furthermore, the FEIR should include an update on outreach efforts to property owners and potentially displaced business owner at Widett Circle, as the land takings to accommodate this potential facility should inform the determination of a Preferred Alternative. C.21 C.22

As part of the FEIR, I encourage MassDOT to consider additional ways to reduce impacts to environmental resources through design modification or the addition of features to further mitigate potential impacts. Additional recommendations provided in this Certificate may result in a modified design that enhances the project's ability to avoid, minimize, or mitigate Damage to the Environment. The FEIR should discuss steps MassDOT has taken to further reduce the impacts of the project since the filing of the DEIR, or, if certain measures are infeasible, the FEIR should discuss why these measures will not be adopted. C.23 C.24

The FEIR should describe the interrelationship of the Preferred Alternative with the SSAR project. While each alternative assumes the completion of the SSAR, this project's funding and construction schedule is beyond MassDOT's control. Therefore the FEIR should provide additional analysis of how proposed platform lengths, column placement, passenger waiting areas, and passenger access points are reliant on either action to be undertaken by SSAR or MassDOT and discuss contingencies in MassDOT's Preferred Alternative design if SSAR does not proceed prior to the SSX project. C.25 C.26

Land

The FEIR should identify the extent of proposed land takings associated with the project at Widett Circle and Readville Yard 2. The FEIR should characterize the existing conditions on these properties and demonstrate that takings have been limited to the extent practicable given MassDOT's proposed programming needs. The FEIR should discuss MassDOT's legal and regulatory obligations associated with private property takings and describe how MassDOT intends to meet these requirements going forward with the Preferred Alternative. C.27 C.28

The FEIR should identify the extent and location of known easements, particularly those associated with water and sewer infrastructure, within the SSX project area. The FEIR should clarify how these easements may impact project construction and operations, and ensure ongoing access to these utilities by the MWRA and/or BWSC for maintenance. C.29

Traffic and Transportation

The FEIR need not include an updated traffic analysis, unless the Preferred Alternative substantively deviates from the Alternatives evaluated in the DEIR with respect to anticipated traffic generation. However, MassDOT should reevaluate the feasibility of additional intersection mitigation measures to further reduce the number of intersections in the study area that currently, or in the future, operate at LOS E and F. If additional mitigation is not proposed, the FEIR should discuss why mitigation measures are infeasible. The FEIR should update proposed TDM measures, traffic-related elements of the proposed CMP, or other relevant traffic mitigation measures as necessary to reflect final design elements of the Preferred Alternative. The FEIR should provide additional data supporting the assumption that approximately 30 to 40 percent of South Station-bound traffic trips will be diverted to a reopened Dorchester Avenue in the Build Alternatives. The FEIR should include graphics identifying proposed routes to and from South Station from key roadways and locations such as South Boston, I-93 north, I-93 south, and the MassPike. C.30 C.31 C.32 C.33

The FEIR should also include conceptual plans at a legible scale for any proposed transportation improvements that clearly identify lane widths, expanded areas of pavement or removal of medians/open space, traffic signals, pedestrian, bicycle, and transit accommodations. This information is necessary to confirm that adequate area is available to ensure the viability of proposed infrastructure improvements and transportation mitigation measures. C.34

The FEIR should include detailed conceptual plans for Dorchester Avenue that clearly indicate the location of and describe available curbside capacity for taxi cabs, MBTA buses, shuttle services, and passenger vehicle drop-off and pick-up. C.35 The FEIR should discuss how curbside drop-off/pick-up areas will be accessed and designed to avoid conflict with bus operations, pedestrians and bicyclists. C.36 The FEIR should describe how a reopened Dorchester Avenue may be used to reroute MBTA buses to provide more direct bus connections to downtown. C.37

Public Transit

The FEIR should demonstrate that the preferred South Station design will mitigate existing or potential areas of congestion and poor pedestrian LOS, including projected pedestrian congestion on at-grade rail platforms, within the rail head concourse, and connections to the Silver Line and Red Line platforms in the Build Alternatives. C.38 MassDOT noted in the DEIR that it will consider the potential for an elevated intercity and commuter rail concourse level that facilitates mid-platform boarding and alighting during normal operations, thereby reducing the overall congestion level on the platforms and concourses.

As noted previously, the project scope will not be expanded to include the NSRL. However, the FEIR should discuss the current planning (State and federal) and funding status for the NSRL and provide additional detail on how the Preferred Alternative will be designed to ensure that its future construction is not precluded. C.39 This discussion should include how platform, concourse, headhouse and circulatory routes may be incorporated into potential future access to additional subterranean tracks, or at a minimum, will not preclude construction of future tunnels and support structures.

Pedestrian and Bicycle Accommodations

MassDOT should continue to refine pedestrian and bicycle connection plans between South Station and adjacent streets, the Harborwalk, and through and around South Station to the adjacent neighborhoods (i.e., Fort Point Channel, Seaport District, South Boston, Chinatown, Leather District, etc.). C.40 The FEIR should clearly identify these routes and accommodations (e.g., bicycle lanes) and note how the design of the South Station headhouse will enhance these connections. The FEIR should provide additional detail on the conceptual sizing and location of the proposed long-term and short-term bicycle parking, including the anticipated number of bicycle parking spaces based upon mode-share data for South Station. C.41

Transportation Monitoring

The FEIR should clarify elements of the proposed monitoring program, including the types of data to be evaluated, frequency of monitoring, steps to provide further mitigation if anticipated operations and mode share splits are not achieved, and distribution of the reports. As suggested by the Metropolitan Area Planning Council (MAPC), I recommend that MassDOT commit to conducting a monitoring program for all Build Alternatives (Alternatives 1, 2, and 3). C.42

Wetlands and Waterways

The FEIR should identify the location and type of wetlands resource areas on the South Station and layover facility sites, delineated in accordance with the WPA and describe how the project will be constructed in accordance with applicable wetland resource area performance standards. The FEIR should clarify the jurisdiction of the potential isolated vegetated wetland on the Readville Yard 2 site. If alteration of this wetland requires a 401 WQC, the FEIR should discuss how MassDOT will meet the 401 WQC regulations and any applicable performance standards. C.43 C.44

The FEIR should discuss the outcomes of the master planning process required in the MHP Phase 2 Decision and the subsequent anticipated MHP Amendment, providing details on the plan components, the design parameters established by the MHP Amendment, public outreach efforts, and other plan aspects. It is anticipated that the master planning process and the MHP Amendment will draw from the City's Fort Point Channel Watersheet Activation Plan that was completed in 2002 to provide a menu of public benefits for development projects along the channel. As noted by the City of Boston and CZM, the Amendment to the MHP must be approved by the EEA Secretary prior to the submission of the FEIR. C.45

The FEIR should include conceptual design plans, graphics and a supporting narrative for the Preferred Alternative that details the location of uses within the building on tidelands and facilities dedicated for public use consistent with c.91 regulatory requirements and/or the MHP Amendment, as applicable. The FEIR should include an updated discussion demonstrating how the South Station site will be designed to meet the c.91 licensing criteria for a non-water-dependent (transportation improvements, joint/private development) and water-dependent (Harborwalk extension) uses. C.46 C.47

As noted by CZM, the Alternative 3 shadow analysis performed to demonstrate compliance utilized a preliminary building massing concept. The actual layout of the buildings may change as the development of the site progresses from conceptual to actual. Therefore, to assess all possible shadow impacts of the maximum build out, during the MHP Amendment process, a shadow analysis should be completed using the full envelope of possible Alternative 3 build out. This shadow analysis will result in more shadow impact than would be possible under an actual design, but it will show all of the possible locations where shadow might occur and how much impact is possible with any particular arrangement of buildings at the maximum height. This analysis should be provided for reference in the FEIR. C.48

The SSX project does not currently include a water transportation connection. The FEIR should discuss the feasibility of extending water taxi service to South Station. The DEIR noted that non-navigable portions of Fort Point Channel are located north and south/southwest of the C.49

South Station site, but do not include that portion of the channel directly east of South Station. According to the DEIR, the ACOE has deferred final determination of the navigability status of Fort Point Channel at the South Station site, pending further review. The FEIR should discuss how this determination may impact potential water transportation access to the South Station site.

The FEIR should include an updated discussion of how the project complies with the Public Benefit Determination (301 CMR 13.00) criteria established for non-water-dependent projects located completely or partially within tidelands or landlocked tidelands based upon the selection of Preferred Alternative for the project (South Station site and Widett Circle). Specifically, the FEIR should include a discussion of: the purpose and effect of the project, impact of the project on abutters and the surrounding community, enhancement to the property, benefits to the public trust rights in tidelands, benefits provided through previously obtained municipal permits, community activities on the South Station site, environmental protection and preservation, and public health, safety, and general welfare. At the conclusion of the MEPA process (i.e., in conjunction with a Final EIR), I will issue a Public Benefit Determination in compliance with the provisions of *An Act Relative to Licensing Requirements for Certain Tidelands* (2007 Mass. Acts ch. 168, sec.8). C.50

Stormwater

The FEIR should include a complete stormwater report, with supporting data and graphics, for the South Station and layover facility sites. This analysis should demonstrate compliance with MassDEP's SMS, as applicable and the guidance presented in the MassDEP comment letter regarding compliance with the redevelopment standards. MassDOT should gather necessary on-site soils and hydrology data to demonstrate the feasibility of surface or subsurface stormwater management BMPs. If feasible, the FEIR should incorporate these BMPs into the stormwater management system design. The FEIR should clarify which proposed BMPs will specifically be implemented within the project to meet the TMDL and Land Uses of Higher Potential Pollutant Load (LUHPPL) requirements. The stormwater management report should include conceptual BMP designs. If climate change adaptation and resiliency measures include designing the stormwater management system to accommodate more frequent and intense storm events, the FEIR should explain how this measure was accounted for in the stormwater management report. C.51 C.52 C.53 C.54

The project includes the use of existing drainage infrastructure. The FEIR should include improved graphics at a legible scale identifying the location of project area stormwater infrastructure (i.e., pipes, easements and outfall locations) and CSO connection locations. The FEIR should describe the condition of the stormwater and CSO pipes and outfalls to Fort Point Channel to ensure the feasibility of their use in conjunction with the project. MassDOT should work with the BWSC to assess the feasibility and potential stormwater management benefit of constructing a dedicated drainage system for the South Station and Readville Yard 2 sites. MassDOT should present the results of this analysis in the FEIR. C.55 C.56 C.57

The DEIR noted that pervious areas on the eastern and western sections of the Widett Circle site may be suitable for surface stormwater BMPs. The FEIR should report on the

outcome of soil investigations undertaken to determine the infiltration capabilities and overall suitability of the existing soils for the implementation of surface stormwater BMPs. The FEIR should also evaluate the current condition of the 54-inch drainage pipe at Readville Yard 2 and discuss whether it will be relocated in conjunction with the layover facility expansion. Related proposed conditions plans should reflect this infrastructure change, if applicable. The FEIR should include an additional evaluation of the feasibility of surface or subsurface detention, retention, and/or filtration systems at the Readville Yard 2 layover site. C.58 C.59 C.60

The FEIR should include an assessment of the existing drainage system outfalls to Fort Point Channel to confirm their feasibility for reuse as part of the project, conceivably under a different set of conditions than their original design (e.g., elevated tail water or storms with greater precipitation frequencies). C.61

Climate Change Adaptation

The DEIR identified clear risks to South Station and the Widett Circle layover facility in both increasing sea level rise and hurricane scenarios. While sea level rise will occur incrementally, the risk associated with hurricanes is more acute. The FEIR should discuss how climate change and storm adaptation and resiliency measures will be selected and implemented, either as part of the original project design, or within the design life of the project, with a clear commitment to implementation by MassDOT. MassDOT should consider how adaptable the proposed infrastructure will be in the future, and consider upfront adaptation measures that will be very difficult to implement once the infrastructure is in place. These measures should include, but not limited to, designing the stormwater management system for more intense rain events, installation of tidegates on outfalls, using innovative methods of track manufacturing and installation designed to minimize the buckling effect during extreme heat events, and designing the station and tracks to avoid or withstand flooding impacts associated with hurricanes and the 100-year flood event. If the proponent is considering raising the base level of the site, MassDOT should study the potential flooding impacts to adjacent sites and identify these potential impacts in the FEIR. C.62 C.63

As noted in the DEIR, MassDOT, in partnership with FHWA, is conducting a vulnerability assessment project that will identify infrastructure target areas and assets that may be particularly vulnerable to current and future flooding events. The project is composed of seven phases, including: inventory and survey of assets, hydrodynamic analysis, a vulnerability assessment, an adaptation strategy, and is anticipated to result in a final report and presentation by the end of 2014. The FEIR should include a sensitivity analysis comparing the results of this vulnerability assessment and its associated model, the Boston Harbor Flood Risk Model, with that presented in the DEIR to determine if the extent of potential flooding during the evaluated scenarios encompasses a larger than anticipated area. The results of this analysis should be used to guide the selection of appropriate and feasible climate change adaptation and resiliency measures presented in the FEIR. C.64

Finally, the FEIR should provide additional data on the potential depths of inundation within the SSX project area in the 100-year, 100-year plus two feet of sea level rise, and hurricane modeled events. CZM has requested that MassDOT consider a range of flooding C.65

events over the lifetime of the project and provide information about frequency and the expected severity of inundation on the site. Knowing the severity of the anticipated flooding over the design life of the structures during various flooding events will help to inform and identify adaptation strategies.

Water and Wastewater

As requested by MassDEP, the FEIR should include a table further clarifying existing and proposed project-related wastewater flows, including those that may currently be attributable to the USPS facility and those identified as part of the SSAR project. C.66

The FEIR should demonstrate that any proposed changes to the physical configuration, location, and/or hydraulic performance of sewers and outfalls will not affect compliance with Federal Court mandates and regulatory requirements. C.67 The DEIR identified potential impacts from sea level rise and coastal storms to CSOs and MWRA facilities indicating that three CSO outlets to Fort Point Channel near the South Station site may require additional mitigation measures to minimize seawater entering back into the CSO lines. C.68 The FEIR should describe in further detail the nature, potential scope, and location of these impacts and identify potential migration measures and the anticipated responsible party.

The FEIR should clarify potential water use and wastewater generation at the proposed layover facilities based upon operational programming (e.g., car washing). C.69 The FEIR should identify any additional permitting requirements if industrial wastewater discharges are proposed as part of the project and discuss BMPs that could be implemented to reduce water use and wastewater discharges (e.g., use of recycled wash water). C.70

Air Quality

The FEIR should clarify if the air quality analysis conducted in the DEIR considered the potential concentration of air pollutants within the platform and track area at South Station subsequent to the construction of Build Alternatives 2 or 3. If this analysis did not evaluate this condition, the FEIR should include supplemental analyses of criteria pollutants, UFPs and DPM in the Build Condition. C.71

The FEIR should discuss how the preferred station design and South Station platform and track layout will not alter the anticipated noise and vibration characteristics of the site modeled in the DEIR. C.72 If the Preferred Alternative will alter these modeling results, the FEIR should include an updated noise and vibration analysis conducted in accordance with FRA and MassDEP requirements to ensure that appropriate mitigation measures are provided.

Conceptual plans in the FEIR should indicate the location, type and elevation of proposed noise barriers within the SSX project areas. C.73 The DEIR also noted that noise levels inside South Station may increase by 3 to 5 dBA in the 2035 Alternatives 2 and 3, depending on the reverberation characteristics of the enclosed space. The FEIR should identify how station design elements will provide noise mitigation in interior spaces. C.74

The FEIR should discuss whether MassDOT will implement noise and operational best management practices (BMPs) equal to or more stringent than those currently utilized at other layover facilities along the commuter rail. MassDOT should confirm that a forum for citizen complaint will be implemented as a BMP in the operational plan for any proposed layover facilities and at South Station. The FEIR should identify these proposed BMPs and note any contractual obligations associated with the operator of the MBTA's commuter rail. Specific consideration should be given to the hours of operation at each layover facility, potential idling times of locomotives and proximity to sensitive receptors. The FEIR should include a feasibility assessment of potential mitigation measures, a phasing plan for their implementation, and identification of responsible parties for their construction and maintenance. C.75 C.76

Greenhouse Gas Emissions

The FEIR should clarify certain elements of the stationary source and mobile source GHG analyses presented in the DEIR. The FEIR should provide additional analysis, documentation or descriptive narrative as necessary to address the concerns identified below.

The FEIR should include a clear and complete listing of modeling inputs (e.g., R-values, U-values, efficiencies, lighting power density, etc.) for items such as equipment, walls, ceilings, windows, lighting, HVAC units, etc. that were modeled in the Baseline Case and Build with Mitigation Case to allow for an easier comparison with Building Code requirements. C.77

The FEIR should clarify the calculated total energy use estimates for the Joint/Private Development projects. Energy use estimates presented in the DEIR did not identify any energy use reductions between the Baseline and Mitigation Cases for domestic hot water or exterior lighting, and reductions for miscellaneous equipment loads were only applied to residential uses. The FEIR should provide a discussion of these results. The DEIR noted that the preliminary project design did not include modifications to, or ventilation connection with, the existing South Station facilities. The FEIR should confirm if the preferred station design maintains this separation. If not, the GHG analysis may need to be revised to reflect this interconnection. MassDOT should contact the MEPA office prior to undertaking additional analysis if interconnections are proposed. C.78 C.79

The FEIR should include additional analysis of technical and economic feasibility of the following potential renewable energy sources:

- Veolia steam network connections, including the use of steam to power absorption chillers;
- Solar PV or solar hot water (SHW) installations; and
- On-site CHP, including CHP-serving absorption chillers.

C.80

These analyses should clearly state design assumptions, calculate projected energy savings based upon overall project demand (e.g., domestic water demand, etc.), potential GHG emissions reductions, and describe implementation or permitting challenges.

The FEIR should include at a minimum a commitment to construct buildings to be "solar ready" to facilitate future installation of PV systems. If PV is not financially feasible, I request that MassDOT commit to revisit the PV financial analysis on a regular timetable and to implement PV when the financial outcomes meet specified objectives. C.81

The FEIR should include an updated draft tenant manual to reflect the elements of the Preferred Alternative, the recommendations from MassDEP (if feasible), and any potential modifications to the proposed ownership and/or tenant leasing structure. C.82

The mobile source emissions analysis should be revised to account for indirect electrical use associated with the proposed plug-in facilities at South Station and the layover sites. MassDOT may also choose to evaluate mobile source emissions improvements attributable to reduced idling and congestion associated with the proposed traffic intersection improvements. C.83

The DEIR notes various sustainability benchmarking standards and/or requirements as they apply to MassDOT facilities. The FEIR should clarify which standards MassDOT must adhere to in the final design process and those which are merely informational. The FEIR should clarify how the project intends to meet these standards given, in some cases, the outdated benchmarks (e.g., ASHRAE 90.1-2004 for LEED Plus) compared to current Massachusetts Stretch Code standards. The FEIR should also clarify which sustainable infrastructure rating system MassDOT intends to adopt to ensure the project design meets targeted sustainability goals. C.84 C.85

Historic Resources

The FEIR should describe how the preferred station design will mitigate potential impacts to historic resources. In a letter to Michelle Fishburne at the FRA, dated December 23, 2014, the MHC requested that conceptual designs for new construction and/or modification to the South Station headhouse be submitted to MHC for review and comment. This letter also requested that MassDOT include a matrix of potential effects for National Register-Listed or National Register-eligible historic architectural resources with the Preferred Alternative's APE. The FEIR should provide an update on the Section 106 review process and identify proposed mitigation measures for impacts to historic architectural resources. Interim correspondence and project renderings between the FRA, MHC and/or City historic review authorities should be provided as an appendix for reference. C.86 C.87 C.88

Hazardous Materials

MassDOT will conduct Phase 1 Environmental Site Assessments (ESAs) on the project properties. If any Recognized Environmental Conditions (RECs) are identified, the FEIR should include a draft site-specific health and safety plan (SSHASP). Upon selection of a Preferred Alternative, MassDOT should conduct any Phase II ESA's identified subsequent to the Phase 1 ESA process and present the results as part of the FEIR. If a Phase II is required, the FEIR should identify the components of a draft soil and groundwater sampling and analysis program to ensure compliance with the MCP and inform the selection of mitigation measures proposed in conjunction with the project or the construction process. The FEIR should specifically discuss C.89 C.90 C.91

how MCP-regulated conditions may impact construction techniques (i.e., dewatering, foundation types, etc.) or potential site infrastructure (e.g., groundwater and stormwater management) in the Preferred Alternative. C.92

The FEIR should discuss the potential implications of the AUL on the Readville Yard 2 site. The FEIR should identify the responsible party, plans for remediation, and how compliance with the MCP may impact layover facility design or the construction timeline. C.93

Construction Period

The FEIR should include an evaluation and description of potential construction period access locations and laydown areas for station, rail and layover facilities. I encourage MassDOT to continue to develop staging and construction period access plans in collaboration with the City of Boston, Amtrak, the MBTA and other landowners as required. The FEIR should also describe how Amtrak, MBTA commuter rail and light rail, bus, and freight service will be modified and accommodated during project construction (on a per phase basis) for both the South Station Site and construction of selected layover facilities, as applicable. C.94

I strongly encourage MassDOT to commit to monitoring noise and vibration levels after service starts (with the proposed mitigation in place) to evaluate whether actual noise and vibration levels correspond with the modeled values. MassDOT should indicate how appropriate corrective actions may be determined and implemented if actual values are found to be higher than the projections. C.95 C.96

The FEIR should include a revised draft CMP, as necessary, to reflect the elements of the Preferred Alternative. The CMP should specifically discuss provisions for construction worker parking, noting the challenges of a large urban construction site. The revised draft CMP should also identify potential triggers for remedial action based upon construction period monitoring results. C.97

Mitigation

The FEIR should include a separate chapter summarizing proposed mitigation measures. This chapter should also include draft Section 61 Findings for each State Agency that will issue permits for the project. The FEIR should contain clear commitments to implement mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and contain a schedule for implementation, updating these elements as necessary from those presented in the DEIR. While local roadway improvements may be memorialized in future TAPAs with the City of Boston, the relationship of the project to state-jurisdictional roadways necessitates that the FEIR clearly indicate the implementation of mitigation measures based upon project phasing, either tying mitigation commitments to specific building projects, floor area thresholds, or traffic/wastewater demand or thresholds, to ensure that measures are in place to mitigate the anticipated impact associated with each development phase. C.98 C.99

The project includes a variety of public-realm infrastructure improvements. The FEIR should include a conceptual long-range maintenance plan these public-realm improvements, including identification of responsible parties, to ensure adequate upkeep of these project-related improvements. If a long-term maintenance plan structure is unknown, the FEIR should include a commitment by the MassDOT to work with the City and neighborhood associations to establish a plan. C.100

To ensure that all GHG emissions reduction measures adopted by MassDOT in the Preferred Alternative are actually constructed or performed, I require proponents to provide a self-certification to the MEPA Office indicating that all of the required mitigation measures, or their equivalent, have been completed. Specifically, I will require, as a condition of a Certificate approving an FEIR that following completion of each project construction phase MassDOT provide a certification to the MEPA Office signed by an appropriate professional (e.g., engineer, architect, transportation planner, general contractor) indicating that the all of the mitigation measures proposed in the FEIR have been incorporated into the project. Alternatively, MassDOT may certify that equivalent emissions reduction measures that collectively are designed to reduce GHG emissions by the same percentage as the measures outlined in the FEIR, based on the same modeling assumptions, have been adopted. The certification should be supported by plans that clearly illustrate where GHG mitigation measures have been incorporated. For those measures that are operational in nature (i.e. TDM) MassDOT should provide an updated plan identifying the measures, the schedule for implementation and how progress towards achieving the measures will be obtained. The commitment to provide this self-certification in the manner outlined above should be incorporated into the draft Section 61 Findings included in the FEIR. C.101

Responses to Comments

The FEIR should contain a copy of this Certificate and a copy of each comment letter received. In order to ensure that the issues raised by commenters are addressed, the FEIR should include direct responses to comments to the extent that they are within MEPA jurisdiction. This directive is not intended to, and shall not be construed to, enlarge the scope of the FEIR beyond what has been expressly identified in this certificate.

Circulation

The Proponent should circulate the FEIR to those parties who commented on the ENF, and/or the DEIR, to any State Agencies from which the Proponent will seek permits or approvals, and to any parties specified in section 11.16 of the MEPA regulations. A copy of the FEIR should be made available for review at the nearest neighborhood branches of the Boston Public Library. To save paper and other resources, the Proponent may circulate copies of the FEIR to commenters other than State Agencies in CD-ROM format or post to an online website, although the Proponent should make available a reasonable number of hard copies, to accommodate those without convenient access to a computer to be distributed upon request on a first come, first served basis. The Proponent should send a letter accompanying the CD-ROM or identifying the web address of the online version of the FEIR indicating that hard copies are available upon request, noting relevant comment deadlines, and appropriate addresses for submission of comments.

December 31, 2014
Date

Maeve Vallely Bartlett

Comments received:

11/18/2014	Ned Imbrie
11/24/2014	Katherine Green Meyer
12/1/2014	Coleman Hoyt
12/2/2014	Robert J. La Tremouille
12/7/2014	Congressman Michael E. Capuano (Massachusetts 7th District)
12/12/2014	Steve Hollinger
12/15/2014	City of Boston
12/17/2014	Greater Boston Chamber of Commerce
12/18/2014	Harvard University
12/19/2014	James RePass
12/20/2014	Michael S. Dukakis
12/22/2014	Frank DeMasi
12/22/2014	James G. Grant Co., LLC
12/22/2014	Massachusetts Chapter of the Sierra Club
12/22/2014	New Boston Food Market Development Corporation
12/23/2014	State Representative Frank I. Smizik (15th Norfolk District)
12/23/2014	Massachusetts Port Authority (Massport)
12/23/2014	Robert L. Beal
12/23/2014	Medical Academic and Scientific Community Organization (MASCO)
12/23/2014	State Senator Bruce Tarr (1st Essex and Middlesex District)
12/23/2014	Don't Dump on Us Task Force
12/23/2014	Massachusetts Office of Coastal Zone Management
12/23/2014	Massachusetts Water Resources Authority
12/23/2014	Association for Public Transportation
12/24/2014	Kenneth J. Krause
12/24/2014	Frederick Salvucci
12/24/2014	Joseph Rogers
12/24/2014	Stephen H. Kaiser
12/24/2014	Gerry Pieri
12/24/2014	Brad Bellows
12/24/2014	Adam Castiglioni
12/24/2014	Drew Volpe
12/24/2014	Paola M. Ferrer, Galen M. Nook, Rich Parr, Jessica Roberston (residents of Allston), Anthony D'Isidoro (Allston Civic Association), Matthew Danish (Livable Streets Alliance), Harry Mattison (Charles River Conservancy), and Robert Sloane (WalkBoston)
12/24/2014	State Representative Sean Garballey (Arlington)

12/24/2014	Massachusetts Department of Environmental Protection – Northeast Regional Office (MassDEP – NERO)
12/24/2014	Fidelity Real Estate Company
12/24/2014	Boston University
12/24/2014	Metropolitan Area Planning Council
12/24/2014	The Boston Harbor Association
12/24/2014	Boston Water and Sewer Commission
12/26/2014	Paola M. Ferrer, Galen M. Nook, Jessica Roberston, Matthew Danish (residents of Allston), Anthony D'Isidoro (Allston Civic Association), Steve Miller (Livable Streets Alliance), Harry Mattison (Charles River Conservancy), and Robert Sloane (WalkBoston) (LATE COMMENT)

MVB/HSJ/hsj

5.3. DEIR Comment Letters

Table 5-1 lists the identifying letter number, commenter, affiliation, and date for each comment letter received by MEPA. The annotated comment letters follow this table.

Table 5-1 — List of DEIR Commenters

Letter Number	Commenter	Affiliation	Date
C	DEIR Certificate	MEPA Office	12/31/2014
Government Agencies			
1	John D. Viola, Deputy Regional Director	Massachusetts Department of Environmental Protection - Northeast Regional Office (MassDEP - NERO)	12/24/2014
2	Kairos Shen, Director of Planning, Boston Redevelopment Authority; Vineet Gupta, Director of Policy & Planning, Boston Transportation Department	City of Boston	12/15/2014
3	Brona Simon, State Historic Preservation Officer	Massachusetts Historical Commission	12/24/2014
4	John P. Sullivan, Chief Engineer	Boston Water and Sewer Commission	12/24/2014
5	Marianne Connolly, Sr. Program Manager, Environmental Review and Compliance	Massachusetts Water Resources Authority	12/23/2014
6	Bruce Carlisle, Director	Massachusetts Office of Coastal Zone Management	12/23/2014
7	Martin Pillsbury, Environmental Planning Director	Metropolitan Area Planning Council	12/24/2014
8	Stewart Dalzell, Deputy Director, Environmental Planning & Permitting	Massachusetts Port Authority (Massport)	12/23/2014
State Elected Officials			
9	Michael E. Capuano	Congressman (Massachusetts 7th District)	12/24/2014
10	Sean Garballey	State Representative (Arlington)	12/24/2014
11	Frank I. Smizik	State Representative (15th Norfolk District)	12/23/2014
12	Bruce Tarr	State Senator (1st Essex and Middlesex District)	12/23/2014
Educational Institutions			
13	Gary Nicksa, Senior Vice President for Operations	Boston University	12/24/2014
14	Katherine N. Lapp, Executive Vice President	Harvard University	12/18/2014
Organizations			
15	Vivien Li, President	The Boston Harbor Association	12/24/2014
16	Richard J. Arena, President	Association for Public Transportation	12/23/2014
17	Marion Kaiser, Director Jeffrey Corin, Director	New Boston Food Market Development Corporation	12/22/2014

Letter Number	Commenter	Affiliation	Date
18	Paul Guzzi, President and CEO	Greater Boston Chamber of Commerce	12/17/2014
19	Paul Nelson, Senior Transportation Planner	Medical Academic and Scientific Community Organization (MASCO)	12/23/2014
20	John Kyper, Transportation Chair	Massachusetts Chapter of the Sierra Club	12/22/2014
21	Sue Silver	Don't Dump on Us Task Force	12/23/2014
Individuals and Businesses			
22	Paola M. Ferrer, Galen M. Nook, Rich Parr, Jessica Robertson (residents of Allston), Anthony D'Isidoro (Allston Civic Association), Matthew Danish (Livable Streets Alliance), Harry Mattison (Charles River Conservancy), and Robert Sloane (WalkBoston)	Various	12/24/2014
23	Paola M. Ferrer, Galen M. Nook, Rich Parr, Jessica Robertson (residents of Allston), Anthony D'Isidoro (Allston Civic Association), Matthew Danish (Livable Streets Alliance), Harry Mattison (Charles River Conservancy), and Robert Sloane (WalkBoston)	Various	12/26/2014
24	Jeff Cook, Vice President	Fidelity Real Estate Company	12/24/2014
25	George F. Hailer	James G. Grant Co., LLC	12/22/2014
26	Robert L. Beal	Related Beal	12/23/2014
27	Brad Bellows	Brad Bellows Architects	12/24/2014
28	Adam Castiglioni		12/24/2014
29	Frank DeMasi		12/22/2014
30	Honorable Michael S. Dukakis		12/20/2014
31	Steve Hollinger		12/12/2014
32	Coleman Hoyt, President	Acton Chrysler Dodge Jeep Ram	12/1/2014
33	Ned Imbrie		11/18/2014
34	Stephen H. Kaiser		12/24/2014
35	Kenneth J. Krause		12/24/2014
36	Robert J. La Tremouille		12/2/2014
37	Katherine Green Meyer		11/24/2014
38	Gerry Pieri		12/24/2014
39	James RePass, Founder and Chairman	The National Corridors Initiative	12/19/2014
40	Joseph Rogers		12/24/2014
41	Frederick Salvucci		12/24/2014
42	Drew Volpe		12/24/2014

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Northeast Regional Office • 205B Lowell Street, Wilmington MA 01887 • 978-694-3200

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December 24, 2014

Maeve Vallely Bartlett, Secretary
Executive Office of
Energy & Environmental Affairs
100 Cambridge Street
Boston MA, 02114

RE: Boston
South Station Expansion Project
Summer Street and Atlantic Avenue
EEA # 15028

Attn: MEPA Unit

Dear Secretary Bartlett:

The Massachusetts Department of Environmental Protection (MassDEP) has reviewed the Draft Environmental Impact Report (DEIR) submitted by the Massachusetts Department of Transportation (MassDOT) for the expansion of Boston's South Station on 49 acres, in vicinity of the South Station Transportation Center, which includes the South Station Terminal, the South Station Bus Terminal, the U.S. Postal Service facility, and adjacent roadways in Boston (EEA #15028). Three potential layover facilities at Widett Circle, Beacon Park Yard, and Readville-Yard 2 are elements of the project necessary to facilitate the expansion of intercity and high speed rail service.

There are five major project components. Expansion of South Station will increase the number of railroad tracks from 13 to 20 by the year 2035 and platforms from seven to eleven. The tracks and platforms will be reconfigured, including platform lengths, which will meet Amtrak and MBTA berthing standards. The Tower 1 Interlocking will be modified and most of the approach interlocking will be reconfigured to improve efficiencies and reduce conflicts. The existing headhouse will be expanded from 210,000 square feet (sf) to 400,000 sf, and a new headhouse and entrance are planned along Dorchester Avenue.

The second component is the acquisition and demolition of the US Postal Service Facility. Three alternative layover sites at the Widett Circle, the Beacon Park Yard, and Readville - Yard 2 are the third major element of this project. The DEIR indicates that Beacon Park Yard to the west will be used as a layover facility, and a selection of either Widett Circle or Readville - Yard 2 will be made in the FEIR. The reopening of Dorchester Avenue to extend the Harborwalk with the

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addition of about an acre of open space, and additional development on adjacent land as well as above the expanded South Station facilities are the final two project components.

An evaluation of three alternatives for comparison with the No Build Alternative has been provided in the DEIR. Alternative 1 includes only transportation improvements, while Alternatives 2 and 3 consider the potential for future public/private development with the transportation at two densities, including a minimal level alternative (660,000 sf and 234 parking spaces) and a maximum level (two million sf and 506 parking spaces), respectively. A preferred expansion alternative will be identified in the FEIR. These development alternatives are being considered in comparison with a baseline project that includes the South Station Air Rights Project (EOEA#3205 and 9131) that included 1.765 million square feet of mixed-use development and a 70,000 sf expanded bus terminal with a 775 space parking garage above the terminal. MassDEP provides the following comments.

Wastewater

The DEIR estimates that the wastewater generated by Alternative 3, the maximum build option would be 750,900 gallons per day (gpd), which would more than double the wastewater generated, increasing flow by 411,900 gpd over the existing 339,000 gpd. The DEIR indicates that the existing 22,720 gpd of wastewater flow eliminated with demolition of the post office would off-set this increase. Since it is unclear whether a deduction in wastewater flow has been taken for the post office, and the increase of the other alternatives are not included, it is requested that the FEIR provide a clear table showing the differences and changes in wastewater flow generation by the proposed project. The table should include the actual existing wastewater flow, the estimated increase in wastewater from the previously approved SSAR project, the wastewater increase for the preferred expansion project alternatives, and the off-set reduction in wastewater flow from the elimination of the post office. These data should be tallied to show the increase in wastewater generated by the preferred alternative for the South Station expansion project. 1.1

As of April 25, 2014, the sewer regulations changed and the requirements for a self-certification or a sewer connection/extension permit from MassDEP were eliminated. Under the terms of the new regulations at 314 CMR 12.04(2)(d), MassDEP requires sewer authorities with permitted combined sewer overflows, including the Boston Water & Sewer Commission, to require removal of four gallons of infiltration and inflow (I/I) for each gallon of new wastewater flows generated for any new connection where greater than 15,000 gallons per day of new wastewater flows will be generated.

According the Draft Section 61 Finding, MassDOT makes a commitment to achieve the I/I removal requirements, and to contacting MassDEP and the Boston Water and Sewer Commission to identify the opportunities to eliminate I/I within the project's sewer service area. The DEIR acknowledges that opportunities beyond the service area, e.g., the North End may be included in the I/I removal because there appear to be insufficient opportunities in the vicinity of the project site.

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Wetlands

South Station and the proposed Readville - Yard 2 layover facility would impact wetland resources, as explained in the DEIR (Chapter 4 and Appendix 5). The South Station expansion project site footprint is proposed within 129,200 sf of land subject to coastal storm flowage and 346,900 sf of buffer zone to coastal bank. In addition, repairs to the Fort Point Channel seawall are anticipated. The layover facility at the Readville- Yard 2 would impact about 2,100 sf of the Riverfront Area and 14,200 sf of buffer zone to the inland bank of the Neponset River. These impacts will require submittal of Notices of Intent to obtain wetlands Orders of Conditions for the proposed work on previously developed sites within the resource areas.

Stormwater

According to the DEIR, much of the South Station drainage system was constructed in the 1980s, and that the system to be retained, "(w)ould have to be analyzed to confirm acceptability for use with evolving precipitation intensity and frequency data, and rising sea levels." It is requested that the FEIR expand upon this statement (page 5-17), with information that explains the analysis and/or the results of the analysis to understand the modifications and improvements that would be recommended for the stormwater system to function adequately in controlling flooding on and near the site under future sea level rise scenarios. In recognizing that the CSO outfall elevations are lower than the mean higher-high water level of Fort Point Channel (Appendix 7, page 10), and that higher tailwater elevations would be higher, the DEIR identifies a need for tide gates at these CSO outfalls to minimize localized nuisance flooding. However, tidegates and/or other needed improvements are not specifically identified, except for a notation that the condition of the outfalls at Fort Point Channel would be evaluated and addressed in final design, if necessary.

An overview of the existing storm drain systems in the vicinity of South Station, Widett Circle, Beacon Park Yard, and Readville-Yard 2 is included in the DEIR, (Chapter 4 and Appendix 7). The DEIR also identifies the ten combined sewer outfalls discharging drainage from the South Station site. Water quality impairments and total maximum daily loads (TMDLs for the Fort Point Channel and Boston Inner Harbor, the Charles River and Salt Creek, and the Neponset River are described for the watersheds where the project sites are located. Peak rates and volumes of runoff are provided for all sites. In addition, there is general information on the proposed stormwater management systems and compliance with the applicable city, state, and federal requirements.

For compliance with the Stormwater Management Standards in the wetlands regulations, the stormwater systems would be designed to meet the redevelopment standard, which is applicable when a project on a previously developed site requires no net increase in impervious area. A reduction in imperviousness is reported for the alternatives considered at South Station

(Appendix 7, Table 8), and the layover sites, except for Readville-Yard 2, where imperviousness will increase from 10.9 acres to 14.7 acres (Appendix 7, Table 10,12, and 14). Since there will be an increase in imperviousness, the stormwater management system at Readville-Yard 2 would need to be designed for compliance with the new development stormwater management performance standards. The DEIR indicates that BMPs will be included at this location (Appendix 7, page 37) to meet these standards, but at the level of detail provided in the DEIR, this cannot be confirmed.

The FEIR should be clearer about the water quality treatment trains proposed, considering that there are total maximum daily loads established for the waterbodies where stormwater will be discharged, and that catch basins provide only limited water quality treatment. Water quality treatment best management practices are reported to include catch basins and proprietary separators for the South Station site due to site limitations. The DEIR also reveals that runoff from the additional platform, the expanded concourse, the joint development, and Dorchester Avenue would discharge directly to Fort Point Channel (Appendix 7, page 23). In the absence of conceptual stormwater control plans or additional information, it is requested that the FEIR explain why deficiencies in the stormwater management systems would be unavoidable. For compliance with the stormwater management standards, it is necessary to support a claim that stormwater standards in the wetlands regulations at 310 CMR 10.05(6)(k) are met to the maximum extent practicable and improve existing conditions to comply with 310 CMR 10.05(6)(k)7 and 310 CMR 10.05(6)(o)(2). If it can be demonstrated that full compliance cannot be achieved, then it must be clear that the highest practical level of stormwater management is being provided. 1.2 1.3

The train track drainage system at South Station includes a ditch/subdrain that drains to a catch basin and a closed drainage system. Drip pans also capture pollutants from the undercarriage of the train sets, which is conveyed with stormwater to an oil/water separator that is reported to connect to the sewer system (Section 6.2.1 in Appendix 7). It is requested that conceptual plans of this system design be included in the FEIR. In addition, it should be confirmed that the stormwater discharge from this rail track area and all layover facilities is to the sewer system, given that Chapter 4 also indicates that discharges from the oil/water separator would discharge to the storm drain system or the sewer system. 1.4

MassDEP appreciates that consideration is being given to pervious pavers with underdrains for sidewalks and the proposed Harborwalk along Dorchester Avenue. However, the FEIR should make it clear that pavers and infiltration systems will not be used in areas of site contamination, where stormwater runoff would come into contact with significant pollutant sources, as explained for Stormwater Management Standard 3 in the *Stormwater Management Handbook*, (Volume 1, Chapter 1, page 7). 1.5

Sea Level Rise

By the end of this century, global sea level is projected to rise by two feet under a low emissions scenario, and up to about 4 feet[1], under a high emissions scenario, and the

[1] *Third National Climate Assessment*, http://nca2014.globalchange.gov/report . "In recent years, "semi-empirical" methods have been developed to project future rates of sea level rise based on a simple statistical relationship

Massachusetts coastline is among the areas where sea level rise is predicted to be on the higher end of that range. Nuisance flooding, which is becoming a more frequent, high-tide related coastal impact may have potentially damaging effects on the proposed project. In addition, the impacts of sea level rise also will be exacerbated by extreme weather events that are expected to occur with greater frequency and intensity due to climate changes associated with increasing greenhouse gas emissions. Given the vulnerability of the coastline near the proposed project site, MassDOT will need to anticipate the impacts of sea level rise and the potential for damage to the Commonwealth's transportation infrastructure, personal property, and businesses, due to storm surge, flooding, and an eroding shoreline. 1.6

The DEIR has provided some basic information to document the site's vulnerabilities to flooding and sea level rise, but given the importance of the transportation infrastructure, a more in depth assessment may be appropriate to build in a high level of a resiliency. According to the DEIR, the 100-year base flood elevations from the FEMA Flood Insurance Rate Maps (FIRM) 2009 and Preliminary November 15, 2013 (to be effective 2015) were used to evaluate the flooding impacts due to climate change. A two-foot sea level rise[2] was added (Chapter 5). However, a two-foot increase in elevation was identified in both the Secretary's Certificate and the Massachusetts Coastal Zone Management as the minimum that should be considered in the vulnerability analysis. Even at this minimal level, the empirical analysis shows that floodwaters would inundate the entire project site in certain storm events. Portions of the existing project site are within the 100-year flood elevation currently.

Given the uncertainties relating to sea level rise and the increasing frequency of extreme storm events, vulnerability analyses generally cover a range of impacts under several scenarios. Therefore, it may be appropriate to reconsider the project design vulnerabilities to flooding using more conservative sea level rise parameters, particularly to ensure that the critical public transportation facilities will be sufficiently resilient over the life span of the project. At a minimum, it is requested that the FEIR explain the rationale for the sea level rise(s) selected, and how the information will be used, and/or revised during the project design process, to ensure that the mitigation measures and strategies deployed will be adequate to adapt the project to future flooding conditions and minimize impacts. While Table 5-2 identifies mitigation strategies, it should be clearer whether all of these measures will be implemented. As some measures identified could have major impacts and/or indirect impacts on nearby areas, (e.g., floodwater control dike surrounding the site and raising the base elevation of the site), the potential impacts of the mitigation also should be given further consideration. 1.7 1.8

The DEIR has not explained whether the base flood elevations in the vulnerability assessment (i.e., 10-13 feet NAVD 88) are from the Federal Emergency Management Agency (FEMA) Flood Insurance, 2009 Rate Map, the 2013 map, or a combination of both FEMA maps. For consistency with the revised wetlands regulations (October 24, 2014), pursuant to the definition of Special Flood Hazard Area, 310 CMR 10.04, it should be clear that "(t)he best available information, including, but not limited to the currently effective or preliminary Federal Emergency Management Agency (FEMA) Flood Insurance Study or Rate Map (except for any 1.9

between past rates of globally averaged temperature change and sea level rise. These models suggest a range of additional sea level rise from about 2 feet to as much as 6 feet by 2100, depending on emissions scenario."

[2] The DEIR indicates that the Secretary required a two-foot sea level rise in the vulnerability assessment

portion of a preliminary map that is subject of an appeal to FEMA) for Land Subject to Coastal Storm Flowage…." is used in the empirical analysis.

Chapter 91- Waterways Program

The Waterways Program in MassDEP/Boston Office reviewed the Draft EIR for the referenced project and offers the following comments.

Jurisdiction

The DEIR identifies the South Station Expansion project site as being composed of previously authorized filled Commonwealth tidelands, some of which are considered landlocked tidelands in accordance with a legislative act (section 85 of Chapter 235 of the Acts of 2000). As such, the proponent intends to file a license application for review of the changes in use and structural alterations proposed within 250 feet of the mean high water shoreline. The three layover sites are identified as being on either landlocked tidelands (Beacon Park Yard), subject to a Public Benefit Determination, or uplands (Widett Circle and Readville Yard 2).

Alternative Analysis

Section 4.3 of the DEIR identifies the existing conditions of the project site and the potential impacts of the three potential alternative development scenarios for the South Station Development without choosing a preferred alternative. All alternatives are dependent on the US Postal Service relocating to another site to be determined and evaluated independently. According to the analysis, both Alternative 1 (transportation components only) and Alternative 2 (minimum density joint private development) meet the chapter 91 waterways regulatory requirements.

As a Nonwater-dependent Infrastructure Facility, the massing plan for Alternative 1 appears to meet the specific standards applicable to infrastructure projects at 310 CMR 9.55 by providing publicly accessible open space, opening up Dorchester Avenue to vehicular, pedestrian, and bicycle circulation, and establishing a critical link of the HarborWalk with associated landscaping and pedestrian amenities. Clear visual and pedestrian connections should be provided through the project site to connect existing public ways with the waterfront. The Harborwalk should be designed to be consistent with the City of Boston standards. The massing plan for Alternative 2 is identified as meeting the setbacks, site coverage, height, and use restrictions found at 310 CMR 9.51-9.54, which are applicable to other nonwater-dependent use projects. The DEIR recognizes that this project site was within the geographic planning area for the Municipal Harbor Plan for Fort Point/Downtown area but since the City has not completed the planning analysis for the reuse of the US Postal Service site, no substitutions of the waterways regulations apply to this site. As such, the nonwater-dependent mixed use buildings will be expected to fully activate the interior and exterior of the project site including - providing Facilities of Public Accommodation on the entire ground floor with the exception of up to 25 percent of the area needed for Upper Floor Accessory Services; and providing open space equal to the area devoted to nonwater-dependent use buildings. The Alternative 3 massing concept does not meet the waterways regulations and cannot be evaluated until the city completes its MHP process. Since the DEIR presents conceptual alternatives, these following comments should be considered design standards. The MassDEP will be available for pre-application assistance prior to submitting the Final EIR.

Greenhouse Gas Emissions

According to the DEIR, the plan is for the project to meet or exceed the next version of the Stretch Energy Code (SCH), or whatever code is in effect at the time the building permits are filed (Appendix 12, page 15). The project also will be certifiable under the US Building Council's Leadership in Energy and Environmental Design Massachusetts LEED Plus standard.

The results of an analysis of greenhouse gas (GHG) emissions has been provided in Appendix 12 to demonstrate that Alternative 3 with energy efficiencies would have lower GHG emissions consistent with the objectives in the *MEPA Greenhouse Gas Emissions Policy and Protocol*. The direct and indirect stationary source, GHG emissions were modeled using the eQUEST model, version 3.64. The Building Code, 8th edition, which is based on ASHRAE 90.1-2010 was used as the Baseline Case. Compared with the Baseline, the maximum build alternative has been modeled to show a reduction of CO_2 emissions from stationary sources by about 11.8 percent, (a reduction of 898 tons of CO_2 per year (tpy) with a total emissions generation of 6,736 tpy of CO_2) (Table 3). The supporting model data were not found in the DEIR or the Appendices.

The potential GHG emissions impacts associated with water and wastewater also were quantified in the DEIR, in accordance with the *MEPA Greenhouse Gas Emissions Policy and Protocol*. The GHG emissions are estimated at 82 tons per year, which will be minimized by using low-flow and water less plumbing fixtures, as well as minimal irrigation for plantings, consistent with Massachusetts LEED Plus (page 5-4).

As described and identified in Table 1(Appendix 12, page 11), the stationary source GHG emissions reductions are generally attributable to building envelop energy efficiencies with higher performance materials, high efficiency chillers and condensing boilers with VAV and high efficiency recovery (terminal and mixed-use office/retail), fan coils with high efficiency chillers and condensing boilers (hotel and multi-family), daylighting, efficient lighting (20 percent better than code), and occupancy sensors. MassDOT also has made a commitment to develop a tenant manual as a tool to support high performance building fit-outs and energy efficient operations of facilities.

Renewable energy from photovoltaics, solar thermal, and wind, as well as combined heat and power (CHP) was considered in the DEIR. However, the electricity grid serving the project is likely to be through a spot network of vaults that are not suitable for electricity from distributed generation sources. Therefore, the opportunities to incorporate renewable energy sources into the project at this time appear to be limited. In the event that circumstances become more favorable, MassDOT is encouraged to continue to pursue renewable energy during the design process. 1.10

The potential to the Veolia district steam appears to be feasible and the FEIR should explain whether MassDOT will continue to pursue this option. As pointed out in the DEIR, if the steam source is CHP, then there would be a significant GHG emissions reduction potential from using a district steam source. 1.11

Air Quality – Mobile Source

MassDEP recognizes the importance of expanding South Station's rail capacity as necessary to improve commuter rail service to southern and southwestern Massachusetts regions as well as advance regional interstate/city connections. The DEIR addresses three Build alternatives, one providing transportation improvements only, and two joint public/private development programs (Alternatives 2 and 3). The DEIR states that all Build alternatives would: increase rail capacity by adding seven tracks and three platforms to existing South Station, provide for an expanded South Station headhouse in place of the existing USPS facility, and reconstruct Dorchester Avenue, including construction of a cycle track. In addition, Alternatives 2 and 3 could provide approximately 660,000 square feet of private development with approximately 234 parking spaces and up to 2 million square feet of private development with approximately 506 parking spaces, respectively.

The DEIR contains the recommended air quality analyses. The analyses followed MassDEP-approved modeling protocols. Mobile source project-related emissions are generated from a combination of train and bus activity, layover facilities and, most predominantly, vehicle traffic in the study area surrounding South Station. The project-related pollutant emissions for Alternative 1 in both 2025 and 2035 are higher by one to two percent when compared to the project-related emissions for the respective No Build Alternatives. Project-related emissions for Alternative 3 in both 2025 and 2035 are higher by about three percent when compared to the project-related emissions for the respective No Build Alternative. The proponent asserts that since the air quality analyses demonstrated that emissions from the proposed project would not create a new violation of the NAAQS, the project would not increase the frequency or severity of any existing violations, and would not delay the attainment of any NAAQS. Therefore, no mitigation of project-related emissions is required.

MassDEP recognizes the reduced project scale since the ENF review stage, namely in amount of on-site structured parking. The DEIR reports a parking supply reduction of 66 percent and 68 percent for Alternatives 2 and 3, respectively. The DEIR indicates the current proposed parking supply, and management thereof, is more consistent with transit oriented development (TOD) and with parking ratios as confirmed by the Boston Transportation Department (BTD). MassDEP strongly supports the reduction in parking supply as the focus in shifting mode choice for the tenants of the proposed joint development projects. MassDEP recognizes the proponent's commitment to charging market rates, providing electric vehicle charging stations, expanding bike and car share programs on site, and providing other amenities necessary to promote bicycle, pedestrian and transit trips consistent with MassDOT's GreenDOT Policy. However, MassDEP urges the proponent to explore additional measures in order to produce further trip reduction and associated emissions and maximize the significant opportunity for TOD that South Station presents. 1.12

Recommended Mitigation Measures

MassDEP recommends that the FEIR address the following measures for consideration in the proposed Tenant Manual: 1.13

- Offer parking cash-out incentives as opposed to parking discounts to employees whose parking is provided. This strategy by employers/tenants provides employees with an

option for compensation for not utilizing dedicated parking spaces, thus supporting and encouraging employees to seek travel modes other than driving alone to work.

- Offer alternative work schedules to employees as well as staggered work shifts, where appropriate, to reduce peak period traffic volumes.
- Provide direct deposit for employees.
- Provide a guaranteed ride home to those employees who regularly commute by transit, bicycle, or vanpool to the site and who have to leave work in the event of a family emergency or leave work late due to unscheduled overtime.

MassDEP recommends that the FEIR address the following measures

- The proponent shall improve proposed bicycle parking access from Dorchester Avenue by providing long term bicycle accommodations as appropriate for project tenants as well as rail and bus commuters. Bicycle parking should be as proposed, secure, convenient, weather protected, and should also be sufficient to meet existing and expected future demand. 1.14
- The proponent shall work with BTD and Boston Bike officials to design, support, and fund as necessary, enhanced short term bicycle parking near building entrances as well as off-site bicycle infrastructure to improve access to the project site. Such bicycle accommodations shall employ MassDOT Design Guidelines or engineering judgment, as appropriate.

Recommended Construction Period Air Quality Mitigation Measures

MassDEP recognizes the proponent's commitment to ensure all project contractors comply with MassDEP's Diesel Retrofit Program (DRP). As noted in the DEIR, MassDEP developed this program to control emissions from construction equipment by promoting the use of such engine emission controls as oxidation catalysts or particulate filters for diesel engines to the maximum extent practicable. The DEIR commits to compliance with the Massachusetts Anti-Idling regulation (310 CMR 7.11) which prohibits motor vehicles from idling their engines more than five minutes. In addition, the State's Low Sulfur Diesel standards (310 CMR 7.05) must be met. Furthermore, all construction equipment would be required to comply with 310 CMR 7.11(1)(b) which requires that engines idle for no more than five minutes. 1.15

The MassDEP appreciates the opportunity to comment on this proposed project. Please contact Kevin.Brander@state.ma.us , at (978) 694- 3236 for further information on the wastewater issues, Jerome.Grafe@state.ma.us, at (617)292-5708 for mobile source air quality, and Andrea.Langhauser@state.ma.us, at (617) 348-4084 regarding the Chapter 91 Waterways Regulatory Program comments. If you have any general questions regarding these comments, please contact Nancy.Baker@state.ma.us , MEPA Review Coordinator at (978) 694-3338.

Sincerely,

John D. Viola
Deputy Regional Director

cc: Brona Simon, Massachusetts Historical Commission
Ben Lynch, Sharon Weber, Jerome Grafe, Andrea Langhauser, MassDEP-Boston
Rachel Freed, Kevin Brander, Heidi Davis, MassDEP-NERO

CITY OF BOSTON • MASSACHUSETTS

MARTIN J. WALSH
MAYOR

December 15, 2014

Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
MEPA Office
Attn: Holly Johnson, EEA# 15028
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: South Station Expansion – Draft Environmental Impact Report (DEIR)

Dear Secretary Bartlett,

The City of Boston has been coordinating closely with MassDOT on their South Station Expansion Project. The expansion of capacity at South Station is critical for improved mobility in Eastern Massachusetts and will have a transformative impact on the City and South Station area.

South Station Master Plan & Municipal Harbor Plan Amendment

The City of Boston's Fort Point Downtown Waterfront Municipal Harbor Plan (MHP) includes the United States Postal Service (USPS) property and the adjacent Dorchester Avenue within its planning area. As you know, EOEA issued a decision on Phase II of the plan in March 2004, for the Russia Wharf property (now Atlantic Wharf), which deferred further amendments to the MHP south of Summer Street until the City developed a comprehensive master plan for the area.

The Boston Redevelopment Authority has initiated a master planning process in conjunction with MassDOT and the expansion of South Station, and will file an Amendment to the MHP upon completion of the MHP planning process, which must be approved by the Secretary before the submission of a Final Environmental Impact Report (FEIR).

One of the primary tasks of the master planning and MHP amendment process will include a review of build-out and massing alternatives for the air rights development and an analysis of substitutions to the Chapter 91 Waterways Regulations performance standards and associated

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mitigation, or offsets. The DEIR states that no mitigation is anticipated regarding new shadow cast by the DEIR Build Alternatives due to the net benefit to public use of the waterfront that the project would create. It is presumptive to make these qualifications regarding development related impacts and mitigation on Chapter 91 jurisdictional areas. The MHP planning process must first analyze air rights massing alternatives, which may differ from the DEIR Build Alternatives, review associated impacts on the public realm and watersheet, and then make offset recommendations to EOEEA as part of the MHP amendment.

The master plan and MHP Amendment will also function to implement the City's Fort Point Channel Watersheet Activation Plan, developed in 2002 as a resource of waterfront activation, programming and infrastructure enhancements tied to new development along the Channel. The Activation Plan has anticipated the extension of Harborwalk along Dorchester Avenue, as well as the construction of a new pedestrian connection across the Channel.

Regarding Chapter 91 Waterways jurisdiction on the project site, the DEIR references Section 85 of Chapter 235 of the 2000 Acts of the Massachusetts General Court and indicates the Act establishes Landlocked Tidelands on all filled tidelands more than 250 feet from the high water mark of the Fort Point Channel. The Act, however, only states that Chapter 91 licensing is not required for the construction of structures on air rights over an intermodal transportation center, and makes no reference to Landlocked Tidelands. Greater clarity must be provide on the DEIR interpretation as it could have implications regarding the project Public Benefit Determination and MHP Amendment. 2.1

The DEIR makes no reference to water transportation in the document or technical reports. Water transit should be included as a component of any transit and multi modal analysis due to increases in water transit ridership, South Station's proximity to the Fort Point Channel, as well as a new ferry terminal to be constructed by MassDOT in the spring of 2015 at 500 Atlantic Avenue, which is within a five minute walk of the project site. 2.2

Proposed Head House

While we strongly support this project, we believe there is another alternative station design that should also be considered. The proposed conceptual design outlined in the DEIR places the new station head house midway along the length of Dorchester Avenue. We believe this would put the station's "center of gravity" in the wrong location, out of the way of the primary flow of pedestrian and vehicular traffic. We believe the corner of Summer Street and Dorchester Avenue would make a more logical location.

Locating the new station head house at the corner of Summer Street and Dorchester Avenue would be more logical in terms of access and it would also free up more terra firma land along Dorchester Avenue for joint development. By allowing a greater amount of development on terra firma, we believe more joint development could occur earlier owing to improved financial feasibility. Other flaws of the proposed station concept design as outlined in the DEIR are: a) that it locates the head house and retail on an upper deck, requiring that passengers move up and

down, rather than staying at ground level; and b) it assumes a large and potentially expensive structure would have to be built above the tracks.

The BRA recently conducted a preliminary analysis of the economically feasibility of a station design that assumes that the head house would be located on the ground level of a new building at 245 Summer Street. This feasibility analysis revealed that following goals could be achieved by this alternative design:

- Maximize ground level station space;
- Create viable locations for retail;
- Maximize terra firma for joint development;
- Maintain a 100 foot right of way on Dorchester Avenue; and,
- Create a financially feasible alternative that recoups the market value of 245 Summer Street as well as the value of the proposed high build joint development scenario outlined in the DEIR;

For all the reasons stated above, we strongly urge that an analysis of an alternative design locating the station head house at the corner of Summer Street and Dorchester Avenue be incorporated into the final environmental analysis. 2.3

Track Design

The City of Boston recommends that due to the complexities of air-rights development, it is crucial that the new tracks and platforms incorporate as many structural support elements as possible to ensure the success of future development. MassDOT should also take into consideration the long envisioned utilization of the region's rail corridors by diesel multiple units (DMUs), and in particular should consider any track improvements to accommodate DMU service for the Fairmont Line and, for the "Track 61" corridor which would provide serve to the South Boston Waterfront. 2.4 2.5

Climate Impacts

The Sustainable Design and Climate Change Adaptation section of the DEIR represent the project site as being highly susceptible to inundation from future sea level rise and extreme storm events. MassDOT's Boston Harbor Flood Risk Model should be utilized to better assess the vulnerability of the site, future development and transportation infrastructure to inundation and to evaluate the most effective adaptive measures. The proponent should also coordinate with the New York City Metropolitan Transportation Authority and review applicable storm resilient design and operational measures they have implement since hurricane Sandy in 2012. 2.6 2.7

The project should consider unpredictable climate related events as a key component for the new station design. Predicted incremental changes in sea level rise as well as increased frequency of extreme weather events will impact components of our city's rail system. It is for this reason, as

well as the station's location next to the harbor, that a range of well-established current extreme weather standards and risk management policies should be in place and considered in the design. Major impacts to rail functions can include: 2.8

- Sea level rises and storm surge increase requiring improved railway flood defenses
- Increased harbor and localized flooding leading to washouts and flooding of bridges, embankments, culvert washout, depot flooding and track and lineside equipment failure;
- An increase in the number of days required to monitor track buckling and an increase in the frequency of speed restrictions as a result;
- A reduction in productivity for maintenance workers, due to heat stress;
- A small projected increase in sag of overhead line equipment;
- An increase of passenger heat stress;

We ask that the design account for projected sea level rise and storm surge and recommends a design that provides as much barrier to the train tracks from the waters' edge as possible. Barriers to the waters' edge will enable much needed time for services to maintain shuttling people out of the downtown core in an evacuation scenario. The design should consider emerging/ alternative technologies to reduce heat and flood risks as well as green landscaping along the waterfront edge and surrounding the site in its sidewalks and landscaping. A resilient plan of design for the sea-wall abutting this project should also be discussed as part of long-term resilience plans. 2.9 2.10

The rail network closely co-operates with other interdependent transport and city entities. The site should be planned for considering an evacuation scenario- taking into account customer expectations and how the building layout will aid this process. The building should be designed to enable greater asset management, communications, technical support for operations, planning and delivering maintenance, and delivery of renewals. This plan for the site should address: large-scale temporary absence of staff, permanent or long-term loss of staff, denial of site, loss of mains electricity, disruption of transport, loss of mains water and sewerage, loss of availability of oil and fuel, and loss of fixed line/mobile communications. 2.11 2.12

New Connections

The reopening of Dorchester Avenue in conjunction with this project will provide both a crucial new connection for access to the station, and serve as an important connection between South Boston and downtown. We commend MassDOT for their collaborative efforts in working with the City on the conceptual design for this multimodal roadway. The proposed concept in addition to providing an important vehicular connection, will also provide a generous 2-way cycle track and a new segment of the Harborwalk network. We request that MassDOT consider opening the street for at least pedestrian and bicycle access as soon as possible following the relocation of the USPS. 2.13

As the long-term vision for the 100 Acres area in the Fort Point neighborhood is being realized, combined with an expanded Convention Center, there will be ever increasing demand for access to South Station from this portion of South Boston. The recent analysis from the ongoing South

Boston Waterfront Sustainable Transportation Plan shows that some of the heaviest pedestrian volumes flow from South Station over the Summer Street Bridge and down A Street. With the South Station Expansion project providing access from a reopened Dorchester Avenue, the need for a new pedestrian bridge over the Fort Point Channel south of Summer Street (as has been envisioned in both the Seaport Public Realm Plan and the 100 Acres Master Plan), will be further in demand. We are requesting that MassDOT fund the full design process for this crucial link as a part of their mitigation package. 2.14

Proposed Roadway Operational and Pedestrian Access Improvements

The MassDOT team has worked collaboratively with the City in developing curbside operational improvements to Atlantic Avenue. We are requesting that these low cost improvements be done as soon as possible by MassDOT as they would have immediate benefits to the current accessibility of South Station. 2.15

We are also are supportive of the proposed intersection and pedestrian access improvement concepts that MassDOT has developed with City staff. We feel the seven intersection improvements committed to for the "transportation only" alternative need to be implemented prior to the start of construction for the expansion work, as this will help mitigate the construction period impacts on traffic and pedestrian access. 2.16

We ask that a premier mobility-hub complete with a state of the art bike cage, electric vehicle charging, bike/car-sharing, transit/shuttle link arrival/departure time options be included in the design in prominent locations for efficient transfer and mobility choice. 2.17

Layover Facilities

The City has serious concerns over the proposed Widett Circle layover site. Currently this location provides an easily accessible home for many food processing businesses which is a unique part of the City's economy that would be difficult to relocate to a comparable location within the city.

In the longer term, this area is one of the largest remaining locations for growth and economic development that is essentially in the heart of the city with excellent transportation access. The Mayor recently announced that the adjacent Dorchester Avenue corridor from Broadway to Andrew Stations will be a "strategic planning area", where we will be focusing our efforts in the coming year, and the long term vision for this adjacent geography will further enhance the longer term importance of the Widett Circle area.

We ask that MassDOT continue to work with the city to both reexamine previously evaluated sites as well as consider other new locations for south side mid-day layover. At the same time, the design approach for Widett site should be refined to allow for longer term development that could be accommodated over the layover facility. 2.18 2.19

Thank you for the opportunity to comment on this significant project. For further details please contact Jim Fitzgerald, BRA at 617.918.4327 or Rachel Szakmary, BTD at 617.635.2755.

Sincerely,

Kairos Shen
Director of Planning
Boston Redevelopment Authority

Vineet Gupta
Director of Policy & Planning
Boston Transportation Department

The Commonwealth of Massachusetts
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

December 23, 2014

Michelle W. Fishburne
Environmental Protection Specialist
Office of Railroad Policy and Development
USDOT Federal Railroad Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

RE: South Station Expansion Project, Summer Street & Atlantic Avenue, Boston (Downtown), MA;
MHC # RC.53253. EEA# 15028.

Dear Ms. Fishburne:

The Massachusetts Historical Commission (MHC), office of the Massachusetts State Historic Preservation Officer, has reviewed the Draft Environmental Impact Report (DEIR), received November 5, 2014 for the project referenced above.

The MHC looks forward to receipt of additional information, including the Final Environmental Impact Report (FEIR) that should contain scaled existing and proposed conditions project plans for the preferred alternative, and to the Federal Railroad Administration's (FRA) determinations of effects for the preferred project alternative in compliance with Section 106 of the National Historic Preservation Act (36 CFR 800). 3.1

The DEIR indicates that the proposed project alternatives will be coordinated with other contiguous project environmental reviews, including the South Station Air Rights project (EEA# 3205/9131; MHC# RC.9138) and the I-90 Allston Interchange Project (MHC# RC. 57197), for incorporation into evaluation of preferred project alternatives in the vicinity of the South Station Head House as noted in Chapter 1 and the Beacon Park Yard layover area. Proposed conceptual designs for new construction and/or modification to the South Station Head House should be submitted to the MHC for review and comment as they are developed. 3.2

The DEIR (Section 4.12) includes evaluations of potential visual, atmospheric, and physical effects, through the introduction of new shadows and wind, construction methods and demolition of the USPS General Mail Facility/South Postal Annex on historic properties, including the South Station Head House (BOS.1517), Fort Point Channel Historic District (BOS.CX), 245 Summer Street (BOS.2050), and the Leather District (BOS.AP). It is the opinion of MHC staff that the USPS General Mail Facility/South Postal Annex (MHC # BOS. 1694) does not meet the criteria of eligibility for listing in the National Register of Historic Places (36 CFR 60) pursuant to the 1983 evaluation completed by the USPS. The FEIR should include a matrix of effects for National Register-Listed or National Register-eligible historic architectural resources within the preferred alternative area of potential effect. 3.3

220 Morrissey Boulevard, Boston, Massachusetts 02125
(617) 727-8470 • Fax: (617) 727-5128
www.sec.state.ma.us/mhc

The MHC looks forward to continued consultation with the FRA, MassDOT, and the MBTA, and as project planning proceeds.

These comments are offered to assist in compliance with Section 106 of the National Historic Preservation Act of 1966 (36 CFR 800), M.G.L. Chapter 9, Sections 26-27C (950 CMR 71.00) and MEPA (301 CMR 11). Please contact Jonathan K. Patton or Elizabeth Sherva of my staff if you have any questions.

Sincerely,

Brona Simon

Brona Simon
State Historic Preservation Officer
Executive Director
State Archaeologist
Massachusetts Historical Commission

xc: Mary Beth Mello, Federal Transit Administration
Matthew Ciborowski, MassDOT
Andrew Brennan, MBTA
Secretary Maeve Vallely Bartlett, EEA, ATTN: Holly Johnson, MEPA Unit
Boston Landmarks Commission
Boston Preservation Alliance
Joe Bagley, Boston City Archaeologist
Deborah C. Cox, PAL, Attn: Suzanne Cherau

Boston Water and Sewer Commission
980 Harrison Avenue
Boston, MA 02119
617-989-7000
Fax: 617-989-7718

December 24, 2014

RECEIVED
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MEPA

Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office
Holly Johnson, EEA No. 15028
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: South Station Expansion Project –
Draft Environmental Impact Report

Dear Secretary Bartlett:

The Boston Water and Sewer Commission (Commission) has reviewed the Draft Environmental Impact Report (DEIR) for the South Station Expansion Project (SSX). The SSX project includes five primary elements: the expansion of the South Station terminal facilities, the acquisition and demolishment of the US Postal Service General Mail Facility, the extension of the Harborwalk along the reopened Dorchester Avenue, the future development of the site by private/public partnerships and the development of areas beyond the South Station site for rail vehicle layover.

The Commission submitted comments on the MassDOT's Environmental Notification Form for this project in 2013. A number of those comments submitted have been addressed in the DEIR but several issues will need to be resolved when the size of the project is better understood.

The DEIR presents four alternatives showing various levels of development by private/public

partnerships. The levels begin with demolishing the Postal Service Facility to expand the number of tracks and end with an extensive development over the expanded tracks. The most extensive development scenario will increase the wastewater generated from the South Station site by 122 % from 338,950 gallons per day (gpd) to 750,900 gpd, under Alternative 3.

The Commission owns and maintains water, sewer and stormwater facilities within and abutting the South Station site. The MassDOT is responsible for assessing the whether the existing water and sewer lines have adequate capacity to serve the proposed South Station site for whichever development scenario is selected. 4.1

In addition to developing the South Station site, MassDOT proposes to develop rail vehicle layover areas at: Widett Circle, Beacon Park Yard and Readville – Yard 2. The Commission has concerns about how stormwater will be managed at these sites as well as at the South Station site. The comments related to the layover areas are at the end of this letter.

Currently, most of the stormwater from the South Station site discharges into the Commission's CSO outfall, BOS 065, which in turn discharges to Fort Point Channel. The South Station site is located very close to Fort Point Channel; only a section of Dorchester Avenue and the Harborwalk separate it from this receiving water. Reopening of Dorchester Avenue and the extending the Harborwalk present an opportunity to improve how stormwater is managed in the future. The Commission believes that MassDOT should investigate the development of a drainage system dedicated for the South Station site. 4.2
This dedicated system could provide the project with a system capable of withstanding the higher water levels in Fort Point Channel anticipated in the future. The Commission would also benefit from this system. The capacity of the BOS 065 outfall could be preserved for areas located further away from Fort Point Channel

All of the alternatives for South Station presented in the DEIR propose to substantially increase wastewater flows. In April 2014, the Massachusetts Department of Environmental Protection (DEP) promulgated new regulations which affect agencies responsible for operating collection systems containing combined sewers. The Commission, which possesses a National Pollutant Discharge Elimination System (NPDES) Permit for its combined sewer overflows, is subject to section 12.04(2)(d) of the recent changes to 314 CMR 12.00. The section quoted above requires that all new sewer connections exceeding 15,000 gallons per day mitigate the impacts of the development by removing four gallons of infiltration for each gallon of new wastewater.

The Commission will require MassDOT to participate in the 4 to 1 infiltration reduction program. The proponent will need to commit to participating in this program 90 days before the water service for the project is activated. 4.3

Stormwater discharges from the proposed layover areas

Widett Circle: The MassDOT proposes to create a layover area that would occupy most of Widett Circle. The Commission's Dorchester Brook Conduit abuts this area and provides the means for stormwater to discharge into Fort Point Channel at BOS 070. The proponent will need to contact the Commission to determine how the site can be connected to this conduit. 4.4

In addition, depending upon the SIC Code assigned to the activity on this site, MassDOT may be required to submit a Notice of Intent and a Stormwater Pollution Prevention Plan to the US Environmental Protection Agency. The Commission requests to be copied if these documents are submitted for any of the layover areas or the South Station site. 4.5

Beacon Park Yard: The MassDOT proposes to direct stormwater from this site into the Commission's storm drain that conveys stormwater and flows from the Smelt Brook into the Charles River. The Beacon Park Yard abuts another MassDOT project, the I 90 Interchange which appears to have its own stormwater collection system. The Commission requests that the proponent direct stormwater from Beacon Park Yard to the MassDOT storm drainage system that will be developed for the I-90 Interchange.

Readville – Yard 2: The Readville – Yard 2 site is located along the Neponset River. The MassDOT proposes to direct stormwater from this site to the Commission's 54-inch storm drain which discharges to the Neponset River. The Commission requests that the MassDOT develop a storm drainage system that discharges directly to the Neponset River rather than connecting to the existing system. BWSC_6

Thank you for this opportunity to comment on the South Station Expansion Project.

Yours truly,

John P. Sullivan, P.E.
Chief Engineer

JPS/pwk

c
Frank Depaola, MassDOT
Ronald D. Schlesinger, USPS
M. Zlody, Boston Environment
C. Jewell, BWSC
P. Larocque, BWSC

MASSACHUSETTS WATER RESOURCES AUTHORITY
Charlestown Navy Yard
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Frederick A. Laskey
Executive Director

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December 23, 2014

Maeve Vallely Bartlett, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge St, Suite 900
Attn: MEPA Office, Holly Johnson
Boston, MA 02114

Subject: EOEEA #15028 - Draft Environmental Impact Report,
South Station Expansion Project, Boston, MA

Dear Secretary Bartlett:

The Massachusetts Water Resources Authority (MWRA) appreciates the opportunity to comment on the Draft Environmental Impact Report (DEIR) for the proposed South Station Expansion (SSX) Project (Project) submitted by the Massachusetts Department of Transportation (MassDOT). The purpose of the project is to expand the station terminal capacity and related layover capacity in order to meet current and future high-speed, intercity and commuter rail service needs. A horizon year of 2035 and an approximate opening year of 2025 are used for analysis of the project.

The project consists of these primary components: expanding South Station to accommodate additional platforms, tracks, a new expanded (by 400,000 square feet) headhouse, and passenger amenities, acquiring and demolishing the United States Postal Service facility, constructing rail layover facilities, reopening Dorchester Avenue and extending the Harborwalk. The DEIR evaluates three potential layover facility sites, located at Widett Circle in South Boston, Beacon Park Yard in Allston, and Yard 2 in Readville. The Massachusetts Department of Transportation has not determined the preferred alternative for all project components.

MWRA's comments continue to focus specifically on issues related to wastewater flows and the need to attain required long-term levels of combined sewer overflow (CSO) control in the Fort Point Channel, discharge permitting within the Toxic Reduction and Control (TRAC) Department and 8 (m) permitting from the Wastewater Operations Department.

Wastewater Flows

The Water and Wastewater Technical Report ("WWTR") that accompanies the DEIR describes the existing and proposed wastewater systems in the Project area, existing and proposed wastewater flows, proposed wastewater collection and management plans, and mitigation measures.

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On page 2 of the WWTR, the Proponent reports in the Boston Water & Sewer Commission's (BWSC) assessment that there is adequate capacity in its sewer mains to collect and convey the Project's new wastewater flows, which could increase wastewater flow contribution from the site by as much as 453,150 gallons per day (gpd) at the South Station site, an increase of 122% from existing conditions, according to the WWTR. This may be true for dry weather flow conditions, but downstream BWSC and MWRA sewer systems serving South Station and the other project areas can surcharge and overflow during large storms, due to large volumes of stormwater entering combined sewer systems. Any increase in sanitary flow, if not offset with infiltration/inflow ("I/I") or stormwater removal from hydraulically related sewer systems can be expected to worsen system surcharging and overflows. 5.1

The WWTR separately describes local and state regulations requiring I/I removal at a ratio of 4 gallons I/I removed for every new gallon of sanitary flow to ensure the mitigation of these potential impacts. The Proponent commits to 4:1 I/I removal to offset new wastewater flows generated at the South Station site. I/I removal from hydraulically related systems may occur remote from the project site. It is imperative that the Proponent evaluate how the local sewers to which the project's flows will be connected will perform with the large added flows from the project and the I/I reduction that may occur far afield. Connections to the BWSC sewer pipes should be carefully selected to ensure that any local sewer surcharging is not worsened by the new flows in a way that causes greater CSO discharges at nearby CSO regulators and outfalls, notwithstanding the removal of extraneous flows elsewhere. 5.2

On page 7 of the WWTR, the report states that flows in a 32-inch by 42-inch MWRA sewer that crosses the Beacon Park Yard discharges to MWRA's Cottage Farm CSO facility in Cambridge. While downstream MWRA sewers can overflow to the Cottage Farm CSO Facility, wastewater flows in this sewer are normally conveyed to MWRA's Ward Street Headworks in Roxbury, which directs the flows to the Deer Island Treatment Plant.

TRAC Discharge Permitting

If groundwater is encountered during the construction activities an MWRA Temporary Construction Site Dewatering Discharge Permit will be required pursuant to 360 C.M.R. 10.091-10.094. For assistance in obtaining this permit, both the Proponent and the Contractor (the individual that will conduct the construction) should contact Stephen Buczko, Industrial Coordinator within the TRAC Department at (617) 305-5619. The Proponent and Contractor are prohibited from discharging groundwater into the sanitary sewer system unless a Construction Site Dewatering Discharge Permit has been issued from both the MWRA and Boston Water Sewer Commission. 5.3

Once the South Station Expansion Project is completed, and if the Proponent(s) intends to discharge wastewater from a vehicle wash and/or maintenance operation to the sanitary sewer system, an MWRA Sewer Use Discharge Permit will be required. For assistance in obtaining this permit, the Proponent should also contact Stephen Buczko at MWRA. Similar to the Construction Site Dewatering Permit, the Proponent is required to have this Permit prior to discharging wastewater from the vehicle wash process into the sewer system. 5.4

The Proponent(s) must also comply with 360 C.M.R. 10.016, if it intends to install gas/oil separator(s) in any of its bus and/or rail facilities to support shops, vehicle storage buildings, and/or in the vehicle wash building planned for the site. In addition to complying with 360 C.M.R. 10.000, the proponent(s) will need to conform to the regulations of the Board of State Examiners of Plumbers and Gas Fitters, 248 C.M.R. 2.00 (State Plumbing Code), and all other applicable laws. The installation of proposed gas/oil separator(s) will require MWRA approval and may not be back filled until inspected and approved by the MWRA and the Local Plumbing Inspector. For assistance in obtaining an inspection for each facility the Proponent(s) of each facility should contact Stephen Howard, Source Coordinator, within the TRAC Department at (617) 305-5675. 5.5 5.6 5.7

Section 8 (m) Permitting

Section 8 (m) of Chapter 372 of the Acts of 1984, MWRA's Enabling Legislation, enables the MWRA to issue permits to build, construct, excavate, or cross within or near an easement or other property interest held by the MWRA, with the goal of protecting Authority-owned infrastructure. MWRA owns and maintains large water and wastewater infrastructure within the project area/s. The Proponent's consultants have been working with staff from both MWRA's Water and Wastewater Permitting Groups to ensure that MWRA infrastructure (City Tunnel, Water Main Sections 9, 2 and 3 and Sewer lines Section 1, 162 and 162A) in the vicinity of the Beacon Park Yard Layover Facility is protected. The Proponent is aware that blasting and drilling in the vicinity of the Beacon Park Yard which sits over the City Tunnel is prohibited.

MWRA expects to continue to work closely with the Proponent and their consultants to identify where 8 (m) permits will be required. Should you have any questions or require further information on these comments, please contact me at (617) 788-1165. 5.8

Very truly yours,

Marianne Connolly

Marianne Connolly
Sr. Program Manager,
Environmental Review and Compliance

cc: David Kubiak, MWRA Engineering & Construction
Kattia Thomas, TRAC
Kevin McKenna, MWRA Wastewater Operations Permitting
Ralph Francesconi, MWRA Water Operations Permitting
Adam Horst, Boston Water & Sewer Commission
Kevin Brander, DEP

C:MEPA/15028SouthStationExpansionBostonDEIR.docx

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
OFFICE OF COASTAL ZONE MANAGEMENT
251 Causeway Street, Suite 800, Boston, MA 02114-2136
(617) 626-1200 FAX: (617) 626-1240

MEMORANDUM

TO: Maeve Vallely Bartlett, Secretary, EEA
ATTN: Holly Johnson, MEPA Unit
FROM: Bruce Carlisle, Director, CZM
DATE: December 23, 2014
RE: EEA 15028 – South Station Expansion Project

The Massachusetts Office of Coastal Zone Management (CZM) has completed its review of the above-referenced Draft Environmental Impact Report (DEIR), noticed in the *Environmental Monitor* dated November 5, 2014 and offers the following comments.

Project Description

The South Station site consists of approximately 49 acres south of Summer Street along the Fort Point Channel in Downtown Boston. The project consists of the expansion of the South Station facility onto the adjacent United States Postal Service ("USPS") site along the Fort Point Channel, the construction of one or more layover facilities, and the potential for joint/private development over an expanded South Station. The DEIR identifies and analyzes three different build alternatives; 1) Transportation Improvements Only; 2) Joint/Private Development Minimum Build; and 3) Joint/Private Maximum Build. The alternatives vary in the amount of joint/private development provided for above the expanded tracks on the site. Alternative 1 provides for the expansion of South Station onto the adjacent 16 acre USPS site. The existing building would be demolished, up to seven tracks would be constructed, and the transit concourse would be expanded to include additional passenger support services. This alternative also includes the opening of Dorchester Avenue to public access with vehicular access, bike lanes, sidewalks and an extension of the Harborwalk. Alternative 2 includes all of the components of Alternative 1, as well as the provision for future mixed-use development on the site. The future development would be would be limited to what is allowed by the Waterways Regulations (heights ranging from 55 feet to 142 feet) and is considered the minimum build scenario. Alternative 3 includes all of the components of Alternative 1 as well as the provision for future mixed-use development on the site up to the maximum amount possible. The maximum build would be located closer to the Fort Point Channel with a smaller setback (Water-Dependent Use Zone) than Alternative 1 and would be limited by FAA's maximum building height, which is approximately 290 feet. This alternative would not meet the requirements of the Waterways Regulations and would require an amendment to the City of Boston's Fort Point Downtown Waterfront District Municipal Harbor Plan to allow for increased heights and a reduction in the Water-Dependent Use Zone.

Project Comments

CZM is supportive of the proposed expansion project as it will increase public transportation capacity, increase public access to and along the waterfront, and activate the last remaining privatized portion of the Fort Point Channel. CZM commends MassDOT for meeting the Chapter 91 open space requirements for each of the build scenarios. Connecting the missing Harborwalk link along the channel and creating new public open space will provide significantly more activation and enjoyment of the waterfront in this location.

As discussed in the DEIR, Alternatives 1 and 2 would meet the requirements of the Waterways Regulations and would not require an amendment to the Fort Point Downtown Waterfront District Municipal Harbor Plan. However, Alternative 3 would exceed the dimensions of development allowed by the Waterways Regulations and would require an amendment to the City of Boston's Fort Point Downtown Waterfront District Municipal Harbor Plan.

The City of Boston's Fort Point Downtown Waterfront District Municipal Harbor Plan ("MHP") sets up a planning framework for the area along the Fort Point Channel from the Old Northern Avenue Bridge to the Dorchester Avenue Bridge. Phase 1 of the MHP provided site specific substitutions and offsets for the Intercontinental Hotel parcel located at 500 Atlantic Avenue. Phase 2 of the MHP provided site specific substitutions and offsets for the Atlantic Wharf parcel. The 2004 Secretary's Decision on Phase 2 of the MHP anticipated an amendment of the MHP to provide for track expansion and additional development at the USPS site. The Secretary provided guidance regarding the development of an amendment for the planning area south of Summer Street, requiring a comprehensive master planning effort for the area prior to submitting an MHP Amendment.

The Phase 2 Decision provided specific guidance for the master planning effort, requiring such an effort to include a discussion on how new development in the area will accommodate both track expansion and state policy objectives for Commonwealth Tidelands. As detailed in the Phase 2 Decision, the master planning effort should convey the overall vision for the area and address the following:

- Public access to high-quality waterfront open space along the Fort Point Channel (and not just concentrated at the southerly end).

- Pedestrian links to the waterfront from inland open spaces areas.

- Preparation of a detailed network plan describing the location and programming of all interior ground-level public space (Facilities of Public Accommodation or "FPAs"). Reflective of the significant Commonwealth Tidelands area, and to ensure year-round public activation of this area, it is expected that at least 25% of the required FPA space to consist of Special Public Destination Facilities.

Following a comprehensive planning process, an MHP Amendment that implements the planning vision for the area can be submitted to the Secretary for review according the procedures outlined in 301 CMR 23.06. Development of the MHP Amendment should be guided by the original Notice to Proceed for the Fort Point Downtown Waterfront District Municipal Harbor Plan. It is anticipated that the master planning process and the MHP Amendment will draw from the City's Fort Point Channel Watersheet Activation Plan that was completed in 2002 to provide a menu of public benefits for development projects along the channel. The MHP Amendment must be approved by the Secretary prior to the filing of a Final Environmental Impact Report (FEIR).

A shadow analysis comparing Alternative 2 with Alternative 3 is included in the DEIR. CZM understands that the shadow analysis was performed using the Chapter 91 compliant build out of Alternative 2 and the massing concept for Alternative 3. The massing concept for Alternative 3 includes a series of 21-story buildings arranged in a particular way on the project site. The use of the Alternative 3 massing concept is helpful to get a general idea of what the potential shadow impacts may be with a maximum build development scenario. However, the actual layout of the buildings may change as the development of the site progresses from conceptual to actual. Therefore, to assess all possible shadow impacts of the maximum build out, during the MHP Amendment process, a shadow analysis should be completed using the full envelope of possible Alternative 3 build out. This shadow analysis will result in more shadow impact than would actually be possible under an actual design, but it will show all of the possible locations where shadow might occur and how much impact is possible with any particular arrangement of buildings at the maximum height.

The DEIR includes a discussion of the existing conditions of the site in relation to flooding during 100-year storm events, and also provides basic information regarding storm conditions with sea level rise of two feet. The DEIR states that approximately 2.9 acres of the site are within the 100-year floodplain and approximately 18.9 acres of the site are within the 500-year floodplain. The DEIR states that adding two feet to the flood elevations would result in a 100-year floodplain that encompasses approximately 38 acres of the site, representing nearly complete inundation of the site and infrastructure during a 100-year flood event. The DEIR focuses on the bounds of inundation, but does not provide information on the depths associated with inundation during a 100-year flood event. CZM requests that the proponent consider a range of flooding events over the lifetime of the project and provide information about frequency and the expected severity of inundation on the site. Knowing the severity of the anticipated flooding over the design life of the structures during various flooding events will help to inform and identify adaptation strategies. CZM requests that the proponent fully consider how adaptable the proposed infrastructure will be in the future, and consider upfront adaptation measures that will be very difficult to implement once the infrastructure is in place. 6.1 6.2

The analysis provided in the DEIR includes a chart of risks and potential hazard mitigation/adaptation strategies, ranging from elevating critical systems to elevating the base level of the site. CZM commends the proponent for including a full range of strategies, and fully supports all efforts to elevate and waterproof all critical systems and infrastructure on the site. If the proponent is considering raising the base level of the site, CZM requests that the proponent study the potential flooding impacts to adjacent sites. While the DEIR provides a range of potential hazard mitigation/adaptation strategies, it does not identify which strategies will be employed. The proponent should present a clear strategy for protecting the proposed infrastructure in the long term. Additionally, the proponent should identify adaptation measures and design guidelines for the proposed buildout associated with Alternatives 2 and 3. An adaptation strategy for new buildings on the site should be developed during the City's MHP Amendment process, and should include clear guidance as to which measures should be implemented at the time of construction and which measures can be employed incrementally after the site is developed. 6.3 6.4

CZM strongly recommends that the FEIR include an analysis of the preferred alternative using the dynamic model described in the DEIR, the Boston Harbor Flood Risk Model. The analysis should be accompanied by a comprehensive adaptation strategy for the proposed project. 6.5

Federal Consistency Review

The proposed project may be subject to CZM federal consistency review, and therefore must be found to be consistent with CZM's enforceable program policies. For further information on this process, please contact Robert Boeri, Project Review Coordinator, at 617-626-1050, or visit the CZM web site at www.mass.gov/czm. 6.6

BKC/vg

cc: Valerie Gingrich, CZM
Ben Lynch, DEP Waterways
Nancy Baker, DEP
Richard McGuinness, BRA
Chris Busch, BRA
Boston Conservation Commission

MAPC
METROPOLITAN AREA PLANNING COUNCIL

Smart Growth & Regional Collaboration

December 24, 2014

Maeve Vallely Bartlett, Secretary
Executive Office of Energy & Environmental Affairs
Attention: MEPA Office
Holly Johnson, MEPA #15028
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: South Station Expansion Project, MEPA#15028

Dear Secretary Bartlett:

The Metropolitan Area Planning Council (MAPC) regularly reviews proposals deemed to have regional impacts. The Council reviews proposed projects for consistency with *MetroFuture*, the regional policy plan for the Boston metropolitan area, the Commonwealth's Sustainable Development Principles, the GreenDOT initiative, consistency with Complete Streets policies and design approaches, as well as impacts on the environment. MAPC also has a long-term interest in alleviating regional traffic and environmental impacts, consistent with the goals of *MetroFuture*. The Commonwealth also has established a mode shift goal of tripling the share of travel in Massachusetts by bicycling, transit, and walking by 2030. It is also important to note that the Commonwealth has a statutory obligation to reduce Greenhouse Gas emissions by 25% from 1990 levels by 2020 and by 80% from 1990 levels by 2050. We take all of these issues into account in our MEPA comments.

The South Station Expansion Project (SSX project) consists of a 49-acre site located in and around the existing South Station Transportation Center. The purpose of the SSX project is to expand rail capacity and related layover capacity in order to meet current and future high-speed, intercity, and commuter rail service needs. The SSX project involves the proposed expansion of terminal facilities at South Station, including the acquisition and demolition of the adjacent U.S. Postal Service General Mail Facility. Providing for potential future development, extending the Boston Harborwalk along a reopened Dorchester Avenue, and designating a rail vehicle layover area are other integral components of this project.

The SSX project will improve the efficiency of public transportation, support forecasted increases in ridership, advance transit-oriented development, and provide multi-modal connections – investments that are all vital to sustaining and improving the Boston area's economy and quality of life. This complex project is a critical component of both the Commonwealth's regional transportation network and the long term growth and viability of the Northeast Corridor.

Included as an attachment to this letter are MAPC's comments on the Draft Environmental Impact Report (DEIR) which focus on the importance of integrating infrastructure improvements with future development. Incorporating these comments will help ensure that the Commonwealth will advance a project that both balances and improves local and regional accessibility along with opportunities for a more livable urban environment.

Thank you for the opportunity to comment on this important project.

Sincerely,

Martin Pillsbury

Martin Pillsbury
Environmental Planning Director

cc: John Barros, Chief of Economic Development
Kairos Shen, BRA
James Gillooly, BTD

Michelle Ciccolo, *President* · Lynn Duncan, *Vice President* · Marilyn Contreas, *Secretary* · Taber Keally, *Treasurer* · Marc Draisen, *Executive Director*

Metropolitan Area Planning Council (MAPC) Comments on
South Station Expansion Project DEIR, MEPA #15028

Joint/Private Development

The Joint/Private Development Minimum and Maximum Build Alternatives are primarily distinguished by the degree to which private development could be accommodated at South Station. Representing the lower and upper limits, Alternative 2 would include approximately 660,000 sf of mixed-use development and 234 parking spaces. Alternative 3 would provide slightly over 2 million sf of mixed-use development and 506 parking spaces.

To help determine the selection of a project alternative, MassDOT is conducting an in-depth financial feasibility analysis of the joint/private development alternatives. This analysis will evaluate revenues that could be accrued by leasing air rights and determine if potential development opportunities would be financially viable from the real estate industry's perspective. While MAPC applauds MassDOT for analyzing the viability of new transit-oriented development, we strongly recommend further exploring creative public/private financing opportunities. Since the SSX project is currently unfunded for construction, it is essential that revenue from private investments be secured to leverage public transportation improvements. 7.1

The SSX project provides a tremendous opportunity to successfully incorporate growth in transit ridership and mixed-use private investment. If properly designed, transit-oriented development could have a transformative impact by creating an active, mixed-use area above and around South Station. MAPC looks forward to reviewing this analysis in the Final Environmental Impact Report (FEIR).

Coordination of Development Projects

- In the next phase of project development, the design elements of the 1.8 million sf South Station Air Rights project and the SSX project will need to be carefully coordinated to ensure consistency in planning and design. If additional private development advances, it is essential that these projects also receive the same level of review.

- To not preclude future private development, MAPC recommends that structural foundations be included as part of the overall station and track design regardless of what alternative is selected. 7.2

Diesel Multiple Units (DMU)

MassDOT's FY2014-FY2018 Transportation Capital Investment Plan has set aside $190 million for the implementation of Diesel Multiple Units (DMU). There are plans to utilize DMU trains on the Indigo Line – which would extend beyond South Station to Fort Point and southwest on the Fairmount Line. There are also plans to utilize DMU service at West Station in Allston.

Harvard University's April 9, 2013 comment letter raised concerns regarding the lack of inclusion of impending DMU service in the SSX project's Environmental Notification Form (ENF). While the DEIR does respond by stating that "MassDOT and the MBTA are currently developing a pilot program for DMU service on the MBTA system, outside of the South Station Expansion project. As MassDOT moves forward on plans for the SSX project, tracks, signals, layover facilities and other infrastructure will be designed so that DMUs can be accommodated in the future." In spite of this response, the DEIR does not provide additional information or analysis regarding DMU service. MAPC respectfully requests that the FEIR include an evaluation of the MBTA's plans to advance DMU service in the future and how the SSX project will integrate this service. DMU service is a critical component since this train-type is quieter, more efficient and environmentally-friendly. DMUs also rely less on layover movements than trains currently issued by the MBTA. 7.3

Vehicular Traffic

There are a significant number of signalized intersections in the study area which are forecast to operate at degraded or failing Level of Service (LOS), especially along Atlantic Avenue and Dorchester Avenue. The table below summarizes the projected LOS for the four alternatives in the year 2035. Intersections highlighted in yellow are forecast to operate at LOS E or F. MAPC recommends that improvements be made to these intersections as part of mitigation if private developments are proposed.

Intersection Capacity Analysis – 2035

	No Build Alterative		**Alternative 1** Transportation Improvements Only		**Alternative 2** Joint/Private Development Minimum Build		**Alternative 3** Joint/Private Development Maximum Build	
Intersection	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Congress Street at Dorchester Avenue	D	C	D	D	D	E	D	F
Atlantic Avenue at Seaport Boulevard	F	F	F	F	F	F	F	F
Atlantic Avenue at Congress Street	D	E	D	E	D	E	D	F
Purchase Street at Congress Street	C	F	C	F	C	F	D	F
Atlantic Avenue at Summer Street	F	E	F	D	F	D	F	D
Purchase Street at Summer Street	E	B	E	B	E	B	E	B
Surface Road at Essex Street/Lincoln Street	D	F	D	F	D	F	D	F
Atlantic Avenue at Kneeland Street	F	E	F	E	F	E	F	E
Surface Road at Kneeland Street	E	F	C	F	D	F	D	F
Dorchester Avenue at West Broadway/Traveler Street	F	E	F	F	F	F	F	F
Dorchester Avenue at West 4th Street	E	D	E	F	E	F	E	F
Purchase Street at I-93 Off-Ramp & Seaport Boulevard	E	F	E	F	E	F	E	F
Congress Street at A Street / Thompson Place	F	F	E	E	E	E	E	E

Source: South Station Expansion Project, DEIR, October 2014, Volume 2: Appendix 9 - Traffic Analysis Technical Report - Tables 36, 47, 65, and 71.

Transportation Monitoring Program
If Alternatives 2 or 3 are selected, MassDOT has committed to working with the Boston Transportation Department to conduct a post-development traffic monitoring program. The program would be conducted prior to the start of construction of each phase and would be repeated six months after the issuance of occupancy certificates. While MAPC is encouraged MassDOT has committed to a monitoring program, it should be more comprehensive. There should also be a monitoring program if Alternative 1 is selected. 7.4

Performance measures should be clearly defined for public transit, walking, and bicycling as well as roadway efficiency and parking. This information will be critical to determine whether the SSX project has been effective in meeting its anticipated outcomes. The results from the monitoring program will provide guidance for project refinements, if necessary. MAPC recommends that MassDOT monitor the project bi-annually for a minimum of five years and share their results publically. A scope and schedule of MassDOT's Transportation Monitoring Program should be clearly outlined in the Section 61 findings. 7.5 7.6

Prioritizing Advancement of Projects
The DEIR states that MassDOT is currently prioritizing the advancement of projects in areas of the Commonwealth currently lacking, or underserved by, rail (particularly the South Coast and Worcester) which can be achieved through the South Station Expansion project. MAPC looks forward to reviewing this prioritized advancement of projects in the FEIR 7.7

Layover Facility
MAPC recognizes that MassDOT has selected the use of Beacon Park Yard in the west as the preferred alternative for a layover facility and that further analysis will be conducted as part of the I-90 Allston Interchange project's environmental review. MAPC is aware that MassDOT may select a preferred alternative for the layover facility sites on the south serving South Station and will present this finding in the SSX project's FEIR.

Grand Junction Rail Line
Will the SSX project affect operations on the Grand Junction rail line? Use of this rail line is a component of the I-90 Allston Interchange Project and future access to this rail line should not be precluded.

Freight
Will the SSX project impact rail freight transportation? If so, this should be addressed in the Final Environmental Impact Report (FEIR). 7.8

U.S. Postal Service General Mail Facility
MassDOT should continue close and collaborative planning with the US Postal Service on the relocation of the General Mail Facility at 25 Dorchester Avenue. 7.9

Reopening Dorchester Avenue and Incorporating Complete Streets Principles
MAPC strongly supports reopening Dorchester Avenue for public use, especially for pedestrians and bicyclists in addition to providing a new headhouse and major station entrance. The reopened segment of Dorchester Avenue would include a new cycle track, buffered from traffic and running parallel to the newly created Harborwalk along Fort Point Channel. The cycle track would also provide new connections between Summer Street and the proposed South Bay Harbor Trail in South Boston. An opportunity is also presented to establish potential bus connections to downtown Boston and the South Boston Waterfront/Innovation District. Furthermore, if properly designed, the SSX project would provide a new area for curbside activity on Dorchester Avenue which could relieve traffic on Atlantic Avenue.

Harborwalk
MAPC applauds MassDOT for including construction of the Harborwalk adjacent to the Fort Point Channel and Dorchester Avenue. In order to ensure the Harborwalk's longevity and the numerous public benefits it offers, the FEIR should explain how the Harborwalk will be maintained following construction. 7.10

Beacon Park Yard
While MAPC is aware that the environmental impacts of a layover facility at Beacon Park Yard will be further evaluated as part of the I-90 Allston Interchange Project, we would like to note that Harvard University has expressed concerns regarding public transportation and safety in their comment letter for the SSX project's ENF dated April 9, 2013. Specifically, Harvard pointed out that Beacon Park Yard will be needed on an interim bases to support construction work related to the I-90 Allston Interchange project and indicated that the development of West Station may be hindered. There is a need for continued coordination as both projects advance. 7.11

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December 23, 2014

Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs (EEA)
Attn: MEPA Office
Holly Johnson, EEA No. 15028
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: The South Station Expansion Draft Environmental Impact Report (DEIR)

Dear Secretary Bartlett:

On behalf of the Massachusetts Port Authority (Massport), thank you for the opportunity to review and comment on the South Station Expansion Draft Environmental Impact Report (DEIR). Massport supports the expansion of South Station and the transit improvements that would enable the much-needed growth in passenger rail along the Northeast Corridor (NEC) and within the Commonwealth of Massachusetts. The project would also facilitate improvements in corridor and regional mobility, passenger experience and comfort, and economic development, and quality of life. The inclusion of the multi-modal transportation and urban design elements of the project will help redefine the area and the connections to the rest of the City.

We offer the following comments:

8.1 • The project team should ensure that the proposed project enhances transit connectivity to the South Boston waterfront. Not only should construction of the project increase capacity for commuter rail service and operations, its design should not preclude the possible implementation of new or emerging transit service concepts that may directly use the rail lines that serve South Station. (Examples of these include new service on the Worcester Line between Allston/Brighton and South Station, connections between Back Bay Station and the South Boston Waterfront, and a connection between the Silver Line Transitway and the western commuter rail tracks along Atlantic Avenue.)

8.2 • The project design should ensure that connections to the Silver Line Transitway and Logan Airport are maintained and improved wherever possible.

We look forward to a continuing engagement on the South Station Expansion Project as it proceeds.

Sincerely,
Massachusetts Port Authority

Stewart Dalzell
Deputy Director
Environmental Planning & Permitting

Cc: B. Desrosiers, T. Ennis/Massport

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Ranking Democratic Member
Subcommittee on Housing
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Congress of the United States
House of Representatives
Michael E. Capuano
7th District, Massachusetts

December 4, 2014

Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
MEPA Office
ATTN: Holly Johnson, MEPA Analyst
EEA #15028
100 Cambridge St., Ste. 900
Boston, MA 02114-2524

Dear Secretary Bartlett:

I am writing with regard to your office's request for comments on the Massachusetts Department of Transportation's (MassDOT) Draft Environmental Report for the South Station Expansion project (SSX), EOEA No. 15028. I appreciate the opportunity to share my thoughts on how MassDOT should proceed with improving the Governor Michael S. Dukakis Transportation Center at South Station (South Station).

First, I want to re-affirm my support for the SSX project. South Station, in the heart of Boston, is a transportation nexus, combining the Silver Line, several MBTA bus lines, the Red Line subway, Amtrak service, commuter rail service and passenger bus service. In order to meet projected future demand from the South Coast, Worcester and the I-495 area, and the Fairmount Line, the number of tracks and bays available for commuter rail and Amtrak must be increased. Though a lovely building, South Station is not fully accessible under the Americans with Disability Act. It is time for MassDOT to make South Station fully accessible. Lastly, the potential opportunity to develop air rights above South Station, in harmony with the City of Boston, is the opportunity to promote continued economic growth and development in Downtown Boston. MassDOT is to be commended for its efforts thus far. As well, I wish to reiterate that I remain willing to assist MassDOT in any appropriate way with regard to moving forward in acquiring the United States Postal Service property on Dorchester Avenue.

In general, my thoughts and comments for SSX are entirely supportive. However, there are several issues for which I would like to underscore their importance. First, I trust that MassDOT will satisfactorily address all relevant environmental, wetland and historical significance regulations. In particular, I expect there is great potential for significant soil contamination on-site, and I encourage MassDOT to address it appropriately. 9.1 Given South Station's proximity to surface water, I cannot stress enough the need to account for future rise in sea level and the impact of a storm surge. 9.2 Finally, I appreciate that the facilities, including passenger amenities, at

South Station are inadequate. However, as MassDOT continues its planning, I strongly suggest that South Station retain its classic rail station look and feel. 9.3

The transportation merits of SSX are plain and I do not feel I need to restate them here. However, there are several transportation issues which I suggest MassDOT address. First is siting the layover facility. I appreciate that adequate layover space is a necessity. However, I am curious as to why only sites in the urban core are being evaluated when surely there are sites outside the City of Boston that would be reasonable locations for layover space. 9.4 I am also curious where the engines and passenger cars will be serviced – does the current South Side Maintenance Facility have the capability, or will one need to be constructed? 9.5 I feel it is important that during construction, the commuter rail and Amtrak trains continue to run, and impacts on both transit and private vehicle traffic be minimized. 9.6 Lastly, I strongly suggest that the final design for South Station be done in such a way that a future link to North Station is not precluded. 9.7

In closing, I would again like to re-state my support for South Station Expansion. I believe that the SSX, when completed, will address unmet public transit needs in the Commonwealth and spur economic growth in Downtown Boston. I appreciate the opportunity to offer my thoughts on how MassDOT should proceed with the South Station Expansion project.

Sincerely,

Michael E. Capuano
Member of Congress

Johnson, Holly (EEA)

From: Rosenberry, John H (HOU) [john.rosenberry@mahouse.gov]
Sent: Wednesday, December 24, 2014 12:00 PM
To: Johnson, Holly (EEA)
Subject: RE: ssx comment
Attachments: SSX Commentary.docx

Hi Holly,

Per our conversation, attached is commentary from Mr. Garballey of Arlington.

Best,

John H. Rosenberry
Legislative Aide
Office of Representative Sean Garballey
State House, Room 540
Boston, MA 02133
Tel: (617) 722-2090
Fax: (617) 722-2848
mailto:john.rosenberry@mahouse.gov

From: Johnson, Holly S (ENV) [mailto:holly.s.johnson@massmail.state.ma.us]
Sent: Wednesday, December 24, 2014 11:59 AM
To: Rosenberry, John (HOU)
Subject: ssx comment

Holly Johnson
Policy and Program Analyst, MEPA Office
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900| Boston, MA 02114
☎: 617-626-1023| 🖷: 617-626-1181 | ✉ holly.s.johnson@state.ma.us

MEPA Office
Attn.: Holly Johnson, EEA #15028
100 Cambridge St., Suite 900
Boston, MA 02114

Dear Secretary Bartlett,

I am writing to you today to echo the sentiments of Representative Frank Smizik of Brookline regarding the South Station Expansion Project. I am strongly in support of the North-South Rail Link Project, and believe that any project which curtails its completion would not be to the best interest to the people of the Commonwealth. Below, please see Mr. Smizik's commentary, humbly submitted for your consideration.

As the largest multimodal transportation hub in Greater Boston, South Station is a critical part of intracity and regional transportation. While acknowledging some key needs in the state's transportation infrastructure, the SSX makes the future creation of a North-South Rail Link, a more comprehensive and significant project, implausible. The Commonwealth would be best served by a project which improves South Station but also completes the North-South Rail Link. Such a project will stimulate economic development, reduce greenhouse gas emissions, and provide access to safe and efficient transportation modes.

The North-South Rail Link alone will remove 55,000 cars from the road each day. If this project is completed in addition to improvements at South Station, the potential is great for significant reduction in motor vehicle use, roadway congestion, and GHG emissions from the transportation sector, the largest greenhouse gas producer in the state. At nearly 30 million metric tons of carbon dioxide equivalents each year the transportation sector emits nearly 40 percent of the state's total emissions annually. Personal vehicle use accounts for nearly 60 percent of these transportation emissions. This is a result of Massachusetts residents driving over 10 percent more miles today (800 miles per year) than they did 20 years ago, and carpooling less than the national average (9 percent of MA residents versus 12 percent of U.S. residents).The North-South Rail link is the best option for the state to reduce emissions from this sector by creating a new travel paradigm, and a safer and more efficient mass transit system.

The rail link and South Station improvements should also reduce both GHG emissions and total energy use in all phases of design and construction. Massachusetts has been the nation's most energy efficient state for 4 years, according to the American Council for an Energy-Efficient Economy. Leadership in energy efficiency is something we take great pride in. Building plans should adopt LEED Plus green building standards, minimize life-cycle costs by use of energy efficiency and renewable energy, comply with the Boston Redevelopment Authorities Climate Checklist, and adhere to the state's stretch energy code standard. Additionally, as a project located close to Boston's waterfront, all designs should account for climate change; this includes but is not limited to: increased frequency of flooding, rising sea levels, and more frequent occurrences of extreme weather. Climate preparedness is lacking in the current SSX

10.1

10.2

proposal. Recent designs for the North-South Rail Link take this into much great consideration. These efforts, in addition to promoting mass transit use and healthy transportation alternatives, will ensure that we improve public health and the transportation system while simultaneously mitigating and adapting to climate change.

Improving the Commonwealth's transportation infrastructure helps improve the state's economy, as the two are inextricably linked. South and North Station are major stops for Amtrak and the Commuter rail, as well as several of the MBTA's transit lines. Both stations are essential passenger destinations for members of the workforce who travel to and from Boston each day, as well as passengers traveling regionally along the Northeast Corridor. Currently there is a gap in the Northeast corridor between North and South Station. This gap requires passengers traveling along these lines to disembark from their trains at North or South Station and travel the one miles gap via either the MBTA or cab to the subsequent station. This break represents a major deficiency in Boston's regional transportation system; connecting these two transit hubs is essential and represents an opportunity to increase performance. Doing so will increase growth and success of the Down-easter service from New Hampshire and Maine, service to New York and Washington D.C., and travel west to Worcester and Fitchburg.

The Northeast Corridor is home to 51 million people responsible for generating 1/5th of the nation's Gross Domestic Product. As Massachusetts' economic competitiveness, business climate, and tourism industry depends on our transportation infrastructure, a connection to this corridor is essential. Completion of this North-South Rail Link will cement this connection and will help to create jobs and bolster our economy by ensuring safe and functional transportation throughout the state and region. This will undoubtedly benefit the residents of the Commonwealth and the region.

A project of the North-South Rail Link's magnitude has the potential to help stimulate economic activity, reduce GHG emissions and pollution, and provide greater accessibility to goods, jobs, and services for citizens throughout Massachusetts. By investing in our public transportation system our economy, society, and environment all stand to benefit. We strongly suggest that the Executive Office of Energy and Environmental Affairs, and the new Administration take this significant opportunity to transform the future of transportation in the region, and repair the damage done from a generation of underfunding, by choosing the North-South Rail Link as a crucial part of any South Station Expansion.

The Commonwealth of Massachusetts
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STATE HOUSE, BOSTON 02133-1054

FRANK I. SMIZIK
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CHAIRMAN
House Committee on:
Global Warming and Climate Change

RECEIVED
DEC 23 2014
MEPA

MEPA Office
Attn.: Holly Johnson, EEA #15028
100 Cambridge St., Suite 900
Boston, MA 02114

Dear Secretary Bartlett,

I am writing you today to discuss the South Station Expansion Project (SSX) and recently released Draft Environmental Impact Report. As the largest multimodal transportation hub in Greater Boston, South Station is a critical part of intracity and regional transportation. While acknowledging some key needs in the state's transportation infrastructure, the SSX makes the future creation of a North-South Rail Link, a more comprehensive and significant project, implausible. The Commonwealth would be best served by a project which improves South Station but also completes the North-South Rail Link. Such a project will stimulate economic development, reduce greenhouse gas emissions, and provide access to safe and efficient transportation modes.

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11.1

11.2

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Improving the Commonwealth's transportation infrastructure helps improve the state's economy, as the two are inextricably linked. South and North Station are major stops for Amtrak and the Commuter rail, as well as several of the MBTA's transit lines. Both stations are essential passenger destinations for members of the workforce who travel to and from Boston each day, as well as passengers traveling regionally along the Northeast Corridor. Currently there is a gap in the Northeast corridor between North and South Station. This gap requires passengers traveling along these lines to disembark from their trains at North or South Station and travel the one miles gap via either the MBTA or cab to the subsequent station. This break represents a major deficiency in Boston's regional transportation system; connecting these two transit hubs is essential and represents an opportunity to increase performance. Doing so will increase growth and success of the Down-easter service from New Hampshire and Maine, service to New York and Washington D.C., and travel west to Worcester and Fitchburg.

The Northeast Corridor is home to 51 million people responsible for generating 1/5th of the nation's Gross Domestic Product. As Massachusetts' economic competitiveness, business climate, and tourism industry depends on our transportation infrastructure, a connection to this corridor is essential. Completion of this North-South Rail Link will cement this connection and will help to create jobs and bolster our economy by ensuring safe and functional transportation throughout the state and region. This will undoubtedly benefit the residents of the Commonwealth and the region.

A project of the North-South Rail Link's magnitude has the potential to help stimulate economic activity, reduce GHG emissions and pollution, and provide greater accessibility to goods, jobs, and services for citizens throughout Massachusetts. By investing in our public transportation system our economy, society, and environment all stand to benefit. I strongly suggest that the Executive Office of Energy and Environmental Affairs, and the new Administration take this significant opportunity to transform the future of transportation in the region, and repair the damage done from a generation of underfunding, by choosing the North-South Rail Link as a crucial part of any South Station Expansion.

Thank you for taking the time to read these comments, if you have any further questions please contact my office.

Sincerely,

X Frank I. Smizik

Frank I. Smizik
15 Norfolk

The Commonwealth of Massachusetts
MASSACHUSETTS SENATE
OFFICE OF THE MINORITY LEADER

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December 23, 2014

Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
MEPA Office, Attn.: Holly Johnson, EEA #15028
100 Cambridge Street, Suite 900
Boston, MA 02114

Dear Secretary Bartlett:

I am writing to comment on the Draft Environmental Impact Report that was recently released regarding the South Station Expansion Project – EEA #15028.

I am aware of many compelling reasons to support connecting North Station and South Station via a Rail Link. Connecting these two stations will not only help to address the capacity issues at both stations, but will also minimize traffic congestion, reduce pollution and ease the commute for North Shore residents. Because of the importance of connecting these two stations, I believe it would be imprudent to initiate other actions that would preclude this goal from being accomplished. 12.1

Thank you in advance for your consideration of my request. Please feel free to contact me if I may be of any additional assistance to you and your staff during your deliberations on this matter.

Sincerely,

Bruce Tarr
State Senator

Boston University Senior Vice President for Operations

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BOSTON UNIVERSITY

December 24, 2014

Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
ATTN: Holly Johnson, EEA #15028
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: South Station Expansion Project Draft Environmental Impact Report (EOEEA#15028)

Dear Secretary Bartlett,

Boston University has reviewed the above referenced Draft Environmental Impact Report (DEIR) submitted on October 31, 2014 and appreciates the opportunity to provide comments on this critical project. The benefits of the South Station Expansion (SSX) project are long-term and regional in nature. The successful implementation of the SSX project will significantly enhance the terminal capacity and operations of this vital regional transportation hub.

This project also has the potential to directly affect Boston University as a result of the large proposed layover facilities at Beacon Park Yard (BPY) in Allston, Massachusetts. Boston University has approximately 5,000 students living in close proximity to the proposed layover facilities and shares concerns with its neighbors in Allston and Brookline about the impact that this large industrial facility may have on this growing residential neighborhood. In this regard, Boston University has four major concerns summarized below and detailed in the following pages:

- The DEIR has failed to fully examine alternative locations or adequately explain why Beacon Yards has emerged as "the preferred" location with the least environmental impact.
- The proposed maintenance facility uses of BPY seem to be vastly understated in the DEIR and are presented differently in the Allston I-90 Interchange Environmental Notification Form (ENF).
- The impact such a significant project and "industrial" use of the property may have on Boston University and the adjoining neighborhoods.
- These issues need to be addressed in the South Station Expansion Final Environmental Impact Report (FEIR) rather than the Allston I-90 Interchange MEPA filings lest they "fall between the cracks."

13.1

1. Alternatives Locations to the BPY Site

Studies undertaken for the SSX project identified the current deficit of layover capacity affecting the operations of the MBTA fleet, specifically during the daytime, off-peak hours. Currently, layover capacity for 28 train sets is needed, though there is only space available for 22 train sets. The study also quantified anticipated layover needs for future operations, noting that by the year 2040 layover space for 49 train sets will be required, resulting in a potential deficit of 21 train sets. In the DEIR, a combination of facilities at BPY, Widett Circle, and Readville Yard 2 are proposed to satisfy these deficits. Yet, it would appear that the entire deficit for the system would be located in Allston, instead of distributing the impacts among several sites. Located to the west of South Station and with space adequate to accommodate 20 eight-car train sets, BPY was identified in the DEIR as a "preferred location." It is not at all clear from the analysis provided that the "preferred alternative" minimizes damage to the environment and is a better solution than a combination of three sites.

Under the "No-Build" alternative described in the DEIR it is stated that an "agreement in principal" has been reached between Harvard University, the current owner of BPY, and MassDOT to use approximately 22 of the available 30 acres of the site for a new commuter rail layover and maintenance facility and a rail station. Boston University requests that MassDOT address the following:

- Please indicate why facilities at BPY are included in the "No-Build" condition while facilities at Widett Circle would be eliminated. A "No-Build" alternative which includes the construction of a 20 train set layover facility is hardly a no-build alternative.
- Please provide an explanation of how each of the four layover alternatives presented in the DEIR will affect the scale and scope of the proposed layover facility at BPY.
- The DEIR indicates that a phasing plan for the potential layover facilities at Widett Circle and Readville Yard 2 will be discussed in the FEIR. Please indicate whether the BPY site will employ a phased approach and how/if that approach will correlate to the final plans for the SSX project.

2. Understated Uses of Layover Facility

Although the layover facility at BPY is proposed as a solution to layover capacity deficits, the Allston I-90 Interchange project indicates a variety of heavy maintenance facilities will be associated with the layover facilities at the BPY site, including wheel truing, car wash, maintenance facilities, and a pit track. These uses were not described in the SSX DEIR and are inconsistent with the stated needs described in the DEIR for increased layover capacity and light maintenance. In addition, impacts from the layover facilities have been described as minor, however the proposed uses at BPY have the potential to create significant, on-going impacts to the surrounding community. A layover and maintenance facility of this magnitude places heavy industrial uses adjacent to one of the main residential areas of the Boston University campus and portions of the residential neighborhood in Allston.

Contrary to the assertion on page 4-4 of the DEIR that "Per Article 51 of the *Boston Zoning Code*, Allston-Brighton Neighborhood District, a rail freight terminal and accessory railroad storage yard are

approved uses without restrictions within the Allston Landing South EDA," the Allston Landing South EDA provides specific performance standards for such uses in Section 51-25. This section of the zoning code states that "the following effects shall not be allowed from any use within an EDA: 1. Any emission of any air, water, or other pollutants or of radiation or any release of toxic or biohazardous material in violation of federal, state, or local regulations. 2. Any noise, air pollutant, vibration, dust, odor, change of temperature, or direct glare of lighting, which emanates more than fifty (50) feet beyond the boundaries of the lot upon which the use is located (or more than twenty (20) feet if the abutting lot into which such emanation occurs is within a Residential Subdistrict), is detectable at such distance by human senses without aid of instruments, and is of sufficient quantity or duration to cause significant annoyance or interference with normal activities." It is a gross simplification to state that a layover facility is an allowed use without restrictions. The analysis in the DEIR does not demonstrate compliance with these local zoning standards and the FEIR should provide the additional analysis necessary to make this demonstration.

3. Appropriate Environmental Report Documentation

It is proposed that environmental impacts associated with the layover facility at BPY are to be considered as a "no-build" alternative and that they be described in the environmental documents associated with the Allston I-90 Interchange project, for which an Environmental Notification Form (ENF) was submitted to the Executive Office of Energy and Environmental Affairs on October 31, 2014. However, the SSX project and the proposed layover facilities at BPY are inextricably linked, as the capacity which may or may not be developed at BPY relates to the overall capacity needed to support expanded South Station operations. Therefore, Boston University requests that the Final Environmental Impact Report (FEIR) for the SSX project continue to address the impacts of the BPY layover facility.

The continued study of current and future MBTA layover capacity needs is well outside the scope of the Allston I-90 Interchange project, as is the continued coordination effort required to conceive of and construct layover facilities at the three proposed locations. As the fundamental components and preliminary layout of the BPY facility were determined by the SSX project, Boston University requests that MassDOT address the following in the FEIR:

- Describe how the results of any further study of the SSX project will be reflected in changes to the proposed layover facilities at BPY and other locations. If changes to the SSX project will not influence the plans for the BPY layover facility, indicate why.
- Please provide an explanation of how MassDOT's ability to acquire the necessary property and overcome the environmental challenges associated with Widett Circle and Readville Yard 2 will affect the proposed facility at BPY. The FEIR should indicate how any difficulties at other proposed layover sites will impact plans for BPY and conversely, how any reduction in planned capacity at BPY would affect plans for Widett Circle and Readville Yard 2.
- The FEIR should outline the process by which changes to the SSX project with impacts to layover facilities will be adequately vetted through a public forum that will explicitly solicit the feedback

of residents, businesses, and stakeholders affected by the BPY layover facilities who may not be aware of the SSX project.

4. Significance and Compatibility of Potential Impacts and the Surrounding Community

Boston University remains concerned about the compatibility of the proposed layover uses with the surrounding neighborhood. Use of layover tracks for 20 train sets along with the heavy maintenance operations planned for BPY may result in significant impacts to abutters. The University requests that MassDOT fully describe and assess the noise, vibration and air quality impacts of the facility in the FEIR and ensure that all applicable mitigation strategies be developed and described for the BPY site given its proximity to a densely settled residential area.

The SSX project presents an exciting opportunity to expand and improve the operations of one of the country's busiest transportation hubs. While Boston University supports the project, potential impacts of the BPY layover facility to the campus and to the local community in Allston and Brookline could be significant. Boston University appreciates your consideration of these issues and stresses the importance of requiring MassDOT to continue consideration of elements of the BPY layover facility in the FEIR for the SSX project.

Sincerely,

Gary W. Nicksa
Senior Vice President for Operations

HARVARD
OFFICE OF THE EXECUTIVE VICE PRESIDENT

December 18, 2014

Hand Delivery; Receipt Requested

Ms. Maeve Vallely Bartlett
Secretary, Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
Attention: MEPA Office

Re: South Station Expansion Project Draft Environmental Impact Report
EEA No. 15028

Dear Secretary Bartlett:

On behalf of the Presidents and Fellows of Harvard University, I am submitting comments on the South Station Expansion Project Draft Environmental Impact Report (DEIR) filed by the Massachusetts Department of Transportation (MassDOT). Our Environmental Notification Form (ENF) comments focused on the proposed use of Harvard-owned land in Beacon Park Yard as a commuter rail layover facility. We were particularly concerned that this proposal needed to be assessed within the larger context of the reconstruction of the I-90 Allston interchange and the construction of a new West Station intermodal center.

As noted on pages 1-7 of the DEIR, MassDOT has decided to continue its review of Harvard's Beacon Park Yard land as the potential site for a new commuter rail layup/layover facility, as part of the I-90 Allston Interchange project. MassDOT has filed an Environmental Notification Form for I-90 Allston Interchange project (EEA #15278) concurrently with the South Station Expansion Project DEIR. The I-90 Allston Interchange ENF reflects a project that includes the reconfiguration of the interchange, the construction of West Station, and the creation of a new rail yard for the mid-day layup/layover layup of MBTA commuter rail trains.

MassDOT proposes to continue its review of the potential rail layup/layover facility at Beacon Park Yard as part of the environmental review for the I-90 Allston Interchange project (EOEA #15278). Harvard has submitted a December 15th comment letter about the Allston Interchange ENF to MEPA, including comments on issues related to the rail yard. Harvard remains interested in the continued analysis of MBTA's future service and layup/layover needs as they may relate to the program and parameters of the layup/layover facility proposed as part of the I-90 interchange multi-modal project. Therefore, Harvard recommends that the Secretary's Certificate for the South Station Expansion Project FEIR require MassDOT to provide the missing data and related analysis regarding future MBTA service

14.1

Harvard Yard Massachusetts Hall Cambridge, MA 02138 TEL 617 495 1524 FAX 617 496 6109 evp.harvard.edu

needs (whether through existing rail lines or new lines) and future layup/layover needs. Ideally, this data and related analysis would be discussed in detail in the DEIR being prepared for the I-90 Allston Interchange project as well. Similarly, Harvard recommends that the Secretary's Certificate on the FEIR require MassDOT to report on the status of Beacon Park Yard as MassDOT progresses through its evaluation of the I-90 Allston Interchange project. 14.2

We look forward to working with MassDOT, public officials and agencies, the Allston Interchange Task Force, our neighbors, and other stakeholders on the continued progress of that important project.

Thank you.

Sincerely,

Katherine N. Lapp
Executive Vice President

cc: David Mohler, MassDOT *(By email)*
James Cerbone, MassDOT*(By email)*

24 December 2014

Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
ATT: MEPA Office

RE: EOEA No. 15028- Draft Environmental Impact Report
South Station Expansion Project, Boston

Dear Secretary Bartlett:

The Boston Harbor Association, a non-profit, public interest organization founded in 1973 by the League of Women Voters and the Boston Shipping Association, has been closely following the proposed South Station Expansion Project. Proposed by MassDOT, the project is designed to expand Boston's South Station terminal capacity and related layover capacity to meet current and future high-speed, intercity, and commuter rail service needs (page 1-1 of Draft Environmental Impact Report).

As such, the project consists of five elements:
---Expand South Station Terminal by adding seven tracks and four new platforms, for a total of 20 tracks and 11 platforms. The existing head house would expand from 210,000 sq. ft. to 400,000 sq.ft., with a larger waiting area, amenities such as retail and food outlets, and better circulation;
---Acquire and demolish existing U.S. Postal Service General Mail Facility along the Fort Point Channel;
---Construct rail layover facilities;
---Reopen Dorchester Avenue and extend the HarborWalk;
---Provide public-private development opportunities to enliven area between Atlantic Avenue and Fort Point Channel.

Four alternatives were considered in the Environmental Notification Form, and are further evaluated in the Draft EIR:
---No Build Alternative (baseline);
---Alternative 1- Transportation Improvements Only;
---Alternative 2- Joint/Private Development Minimum Build
---Alternative 3- Joint/Private Development Maximum Build.

In response to TBHA and others' comments, the Secretary's Certificate on the Environmental Notification Form required the proponent to demonstrate that the number of parking spaces has been reduced to the maximum extent practicable and to look at the

potential impacts of the proposed alternatives on the public realm. The proponent has done so, and made significant changes accordingly.

The Boston Harbor Association strongly supports the Commonwealth's efforts to expand intermodal transportation capacities at South Station. Since the issuance of the Secretary's 2013 Certificate on the Environmental Notification Form, the draft 2014 South Boston Transportation Plan has further reinforced the importance of a robust transportation network for growth of the South Boston Innovation District. Our comments follow:

Permitting Process: Neither the Environmental Notification Form (ENF) nor the Draft Environmental Impact Report (DEIR) identify a preferred alternative. Alternative 1, Transportation Improvements Only, includes not only the expansion of South Station Terminal, but also acquisition and demolition of the U.S. Postal Service facility on Dorchester Avenue, construction of a HarborWalk on a re-opened Dorchester Avenue, and off-site rail layover facilities. Alternative 2 assumes Alternative 1, plus potential public-private development that complies with state and city regulations such as Chapter 91 regulations and the Fort Point Downtown Municipal Harbor Planning Area requirements. Alternative 3 assumes Alternative 1, plus potential public-private development that would only be limited by FAA maximum height limits and would require an amendment to the Municipal Harbor Plan in order to allow substitutions to Chapter 91 standards.

For planning purposes, Alternative 3 is the Maximum Build alternative, and provides "worst case" analysis of localized impacts. Consistent with our suggestions on the ENF, we are very supportive of the changes made to Alternative 3 since issuance of the ENF: the building size has been reduced from the original 2.5 million sq. ft. to a maximum 2 million sq. ft., and the parking has been reduced from the original proposal of 1,370 spaces to a maximum of 506 parking spaces, which is more consistent with a multi-modal mass transit facility. Similar reductions have been proposed for Alternative 2, which we also strongly support.

We ask that the Secretary's Certificate have the proponent look at what transportation and circulation improvements can be made even under the "No Build" baseline alternative. We were very impressed during a 17 December 2014 presentation by MassDOT staff to our Harbor Use Committee of proposed improvements for cyclists and pedestrians at South Station under the three alternatives. While much would stay the same under the "No Build" alternative, there seem to be opportunities to improve pedestrian flow and bicycle usage and storage that could occur even in the existing facility. 15.1

Consistency with Boston's Fort Point Channel Watersheet Activation Plan: The Boston Redevelopment Authority's 2002 Fort Point Channel Watersheet Activation Plan calls for activation of the Seawall Basin of Fort Point Channel, which includes the project site. We strongly commend the project proponent for agreeing to open Dorchester Avenue to the public, providing ADA-compliant sidewalk on the western side of Dorchester Avenue, providing the first-ever HarborWalk segment along Dorchester Avenue, and

providing a 15-foot wide cycle track on Dorchester Avenue. These measures are consistent with the goals of the Activation Plan.

We ask that the Secretary's Certificate also request the proponent to incorporate other elements of the Watersheet Activation Plan, including the potential development of a pedestrian bridge crossing the Channel to enhance pedestrian access between South Station and the areas to the east of the Channel (page 50, BRA Fort Point Channel Watersheet Activation Plan), as well as possible activities on the watersheet, such as a "moveable art barge", water trail/interpretive trail, and "floating island" on the watersheet closest to the U.S. Postal Service (page 27 of BRA Watersheet Activation Plan). 15.2

Given potential changes likely to the Old Northern Avenue Bridge in the next few years as well as advances in state-of-the-art boat designs, we ask that the Secretary's Certificate require all three alternatives to further examine the possibility of water transportation to the South Station area. 15.3

Waterways and Tidelands Impacts and Permits: Alternative 3, Maximum Build alternative, will require a Municipal Harbor Plan Amendment. It is not clear from the DEIR the timetable for convening a Municipal Harbor Plan Advisory Group. We ask that the proponent provide a schedule for the beginning of the Amendment process. Currently, a Municipal Harbor Planning process underway in the Downtown Waterfront area would suggest at least 16-18 months of preparation will be necessary before submission of a proposed Municipal Harbor Plan Amendment to the MA Office of Coastal Zone Planning.

Climate Resilient Project: MassDOT, with state funding as well as federal support from the Federal Highway Administration, has been pro-active in studying ways to make their projects more climate-resilient.

Chapter 5 of the DEIR provides an analysis of the potential impacts of sea level rise and storm surge on the project site. The analysis states in part: "In the absence of mitigation, the 100-year floodplain would encompass approximately 38 acres of the SSX project footprint, representing nearly complete inundation of the site and infrastructure, during a 100-year flood event" (page 5-18 of DEIR). The mitigation measures include elevating power/HVAC sources, relocating critical systems to higher levels, raising the base level of the site, and designing infrastructure and critical equipment to accommodate seawater flooding.

These and other measures in "Table 5.2- Risks and Mitigation Strategies Associated with

Hurricane Surge and Sea Level Rise" of the Draft EIR are excellent initial measures, and we look forward to additional details in the Final Environmental Impact Report. 15.4

Thank you for your consideration.

Sincerely,

Vivien Li
President
The Boston Harbor Association

Association for Public Transportation

Northeast High Speed Rail Association
Massachusetts Association of Railroad Passengers

www.northeasthsr.org
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Richard J. Arena
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23 December 2014

Secretary Maeve Vallely Bartlett
Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs, MEPA Office, EEA # 15028
Attention: Holly Johnson, MEPA Analyst
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: South Station Expansion (SSX) Plans
Via e-mail & fax: Fax: 617-626-1181 Email: Holly.S.Johnson@state.ma.us

Dear Secretary Bartlett:

A key term that arises when discussing the funding and construction of strategic transportation infrastructure is **SUSTAINABILITY**. Under that encompassing term are other project questions:

- Is the project economically, technically, and operationally sound?
- Are life cycle costs as well as construction costs comprehended for this once in a century investment?
- Does it utilize best-in-class, peer-reviewed methodologies?
- Does this project symbiotically make the other transportation pieces in the Megaregion perform better?
- Does the project maximize its environmental improvement potential?

When the $850 million South Station Expansion (SSX) project is looked at under this microscope, it is found to be sadly deficient. The most disconcerting issue is that South Station is not a station at all - it is a stub-end terminal, constrained by the Charles River to its north and Boston Harbor to its east. As a stub terminal, it loses half of its peak capacity as precious time slots must be apportioned to bring full trains out and empty trains in, and vice versa. There is no ability to expand the service north to the population and business areas north of Boston and in New Hampshire and southern Maine. The proposed SSX plan would increase the operational inefficiencies in both the MBTA commuter rail network and Amtrak intercity rail which are forced to run bifurcated systems out of both North and South Stations in Boston.

Around the world, much thought has been given to making train stations attractive, accessible, successful, and efficient. Planners and architects have realized that the most successful stations have the tracks and platforms below grade. The very important ground level is best used for retail (shops, restaurants, other services). These shops attract foot traffic which makes the station not just a transportation mecca; it is also a popular destination. The rents, fees, and taxes generated by the ground level and lower floor shops contribute to covering the operating costs of the station. But without shops on the ground floor, the appeal is gone, as are the benefits of Value Capture Financing.

Association for Public Transportation Response
South Station Expansion Plans EEA # 15028

The Association for Public Transportation (APT) would propose **replacing the current SSX plan with the North/South Rail Link (NSRL) which, via underground tunnels and station platforms, will connect the two separate Boston terminals and likewise connect the region.** True High Speed Rail (HSR) is coming to Boston, but it will be inconvenient for those living north of Boston or in southern NH. It will be easier, quicker, and more convenient for them to fly to other cities on the Northeast Corridor (NEC) rather than take the train – it is simply too cumbersome to transfer from North Station to South Station or to drive to the Boston or Route 128 Westwood HSR stations. The NSRL and a Woburn (Anderson) HSR station north of Boston address that issue nicely, conveniently, and cost-effectively.

Another point to consider is the capacity situation of the Greater Boston MBTA subway. Many key stations, such as Park St., Downtown Crossing, Government Center, and State Street are at or near capacity. This is in part due to commuter rail riders who, due to the split MBTA commuter rail system, have to detrain on the wrong side of the city. To get to their eventual destination, they use the subway, and traverse the downtown core. The NSRL would alleviate this problem by permitting commuters to get closer to their eventual destination without necessarily requiring them to tie up capacity at downtown subway stations.

The bottom line is the SSX project cannot be looked at in a vacuum. It is a critical component of federal plans for a true HSR Northeast Corridor which will feature high-speed train sets operating at 160 mph average speed, with a 220+ mph top speed. The trains will be time and cost competitive with air travel in distances between 200 and 600 miles. South Station, with connections to points north via the NSRL, will be as transformative to the 21st Century regional economy as Logan Airport was to the 20th Century. With the construction of a true high speed backbone rail corridor from Boston to Washington DC, coupled with higher speed connections (110 mph) to other important Massachusetts cities, the changes are dramatic. **Boston would be within 90 minutes of New York, two hours of key Massachusetts cities, and three hours of southern core cities in New Hampshire, Maine and Vermont, as well as Washington, DC by HSR.**

From an environmental standpoint, the SSX project is especially lacking versus the NSRL alternative. Per the North/South Rail Link MIS/DEIS, the NSRL project would:

- Eliminate 55,000 car trips daily and save commuters over 50,000 hours daily
- Eliminate 1 million vehicle miles traveled on the regional highway system in a typical weekday,
- **PREVENT the EMISSION of OVER 580 TONS of GREENHOUSE GAS DAILY**

No other transportation project in the Commonwealth grades out this highly in terms of environmental benefit.

Madam Secretary, APT formally requests that you find the SSX proposal as submitted by the Commonwealth inconclusive and incomplete in that it does not review the substantial benefits of the NSRL. We would further request that you direct MassDOT to appropriate the funding to complete the preliminary engineering of the NSRL, following up the $4.5 million initial study funded by the federal government. APT submits that this is not just good practice, it is a legal requirement. Language in the NSRL MIS/DEIS stated that the proposed right of way for the Rail Link was not to be obstructed by any other development. It is distinctly possible that proposed development at South Station and the South Postal Annex will make constructing the NSRL impossible. The Commonwealth's commuters, businesses, citizens, tax payers, and fare payers deserve better than the incomplete and deficient SSX plan currently proposed. 16.1

Sincerely,

Richard J. Arena
President, Association for Public Transportation

C: Honorable Charles Baker, Governor-elect, Commonwealth of Massachusetts
Acting Secretary Frank DePaola, MassDOT CEO
Ms. Rebecca Reyes-Alicea, US Department of Transportation

New Boston Food Market
Development Corporation

Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
MEPA Office
Attn.: Holly Johnson, EEA # 15028
100 Cambridge St., Suite 900
Boston, MA 02114

RE: EEA # 15028

Dear Secretary Bartlett:

We are writing to comment on the South Station Expansion (SSX) Draft Environmental Impact Report (DEIR), specifically regarding the use of Widett Circle as one of the layover facility sites for South Station.

Currently, Widett Circle is home to our cooperative corporation, New Boston Food Market (NBFM). The 21 businesses in our co-op are in the food service and food processing industry, providing over 700 individuals with valuable manufacturing jobs in the City of Boston. Widett Circle is the perfect location for these thriving businesses, which service the many restaurants, grocers and food suppliers in Boston and Massachusetts. Access to the highways for our hundreds of refrigerated trucks, which serve our customers, is absolutely imperative to the success of our businesses. Our collective businesses at Widett Circle are expect nearly $1 billion in revenues in 2014 and we believe that our current home is crucial to our successful operation. We know of no other site in the City of Boston that can provide such access to highways, public transportation and the space that our co-op requires.

We have had the opportunity to meet with officials from the MBTA real estate division regarding the their long-range plans on the SSX and understand that Widett Circle may be used to park trains that will be connected to electrical connections that will eliminate the need to idle diesel locomotives. We respect the need of the Authority and that it has been seeking for some time additional layover space to accommodate the expansion.

In 2013 we engaged in constructive conversations regarding a thee-acre parcel adjacent to, but not owned by, NBFM, and were agreeable to a proposed taking that would allow the MBTA to efficiently lay-over several trains. We appreciated the MBTA's forthright approach to those conversations, and still prefer that possible use to a proposal for a materials transfer station put forward by a private developer that is wholly incompatible with our businesses.

However, at this time, NBFM cannot support a much broader use of Widett Circle as one of the layover sites included in the SSX until we are made comfortable that the future of the 21 businesses and 700

15 Widett Circle, Boston, Massachusetts 02118
Telephone: (617) 268-8743 Fax: (617) 268-8330
Email: NBFMDC@aol.com

employees in our co-op is safe. The use of Widett Circle as a layover site would displace our businesses and the jobs our businesses provide, and would require the demolition of all existing buildings. Although as it is stated in the DEIR, "it is assumed that these affected businesses would be relocated within the immediate project vicinity in the Boston area, and that no long-term loss of employment would occur," we have no understanding of how, where and when our businesses would be relocated and affected. And, as stated above, we know of no other location in the City of Boston where all of our transportation and space needs could possibly be met. 17.1

We believe MEPA must consider our businesses during this evaluation process and urge you to engage in an active dialogue with our organization if Widett Circle is indeed being considered seriously as one of the layover sites. The continued success of our businesses, and the well-being of our 700 employees, depend on it. We are enclosing a recent story from the Boston Globe regarding our marketplace, the jobs and service that we provide and the challenges we face. 17.2

Sincerely,

Marion Kaiser, Aquanor Marketing Inc.
Director
New Boston Food Market
Board of Directors

Jeffrey Corin, Robbins Beef
Director
New Boston Food Market Corp.
Board of Directors

Enc. - 6 pages

cc: Dr. Beverly Scott, General Manager, MBTA
Congressman Stephen Lynch
Mayor Martin Walsh
Jerome Smith, Mayor's Office of Neighborhood Services
Senator Linda Dorcena Forry
Representative Nick Collins
City Councilor Bill Linehan

15 Widett Circle, Boston, Massachusetts 02118
Telephone: (617) 268-8743 Fax: (617) 268-8330
Email: NBFMDC@aol.com

Olympic proposal adds to worries at Boston food complex

WENDY MAEDA/GLOBE STAFF

New Boston Food Market vendors are worried about being forced off of their valuable Boston real estate to make way for a stadium.

By Callum Borchers | GLOBE STAFF DECEMBER 02, 2014

In the predawn hours, before commuters have brought traffic on nearby Interstate 93 to a standstill, workers in white butcher smocks cleave cuts of beef and chicken, fillet fresh cod, and cold-pack oysters and other seafood for many of New England's top restaurants and supermarkets.

This is the New Boston Food Market, a cooperative of some two dozen meat and seafood wholesalers on the edge of South Boston.

CONTINUE READING BELOW ▼

The 20-acre site — with easy access to the highway and spectacular views of the downtown skyline — is largely unnoticed by passing motorists, but it has caught the eye of the group trying to bring the Summer Olympics to Boston in 2024 as a possible site for a 60,000-seat stadium.

Though the site is barely a long javelin throw from Boston's more celebrated business neighborhood, the Innovation District, meatpackers and fishmongers worry that their livelihood is now at risk because their jobs lack the cachet of tech entrepreneurs.

"Maybe we need to rename ourselves," said Marion Kaiser, chief executive of Aquanor Marketing Inc., a seafood wholesaler: "New Boston Innovation Center."

CONTINUE READING IT BELOW ▼

Photos: New Boston Food

Market

Wholesale food businesses in South Boston are contending with a possible Olympic stadium.

Monday marked the deadline for the local organizing committee to submit its proposal to the US Olympic Committee for how Boston would host the 2024 games; the city is among four US finalists.

Even though an Olympic stadium on their property is far from a sure thing, Kaiser and her neighbors are already gripped by a sense that powerful interests have seized control of their fate — again. The food market was evicted from Quincy Market in 1969, when Boston turned the old "meatpackers row" into the shopping strip it is today.

The New Boston Food Market also finds itself the bullseye of a wide area targeted for development.

On one side of its Widett Circle property is Boston's municipal tow lot, where Robert Kraft, owner of the New England Revolution, reportedly is considering building a soccer stadium.

On an abutting parcel to the east is a cold storage facility that Boston-based Celtic Recycling wants to turn into a transfer station, raising fear of contamination among the food sellers.

"You look next door at the Seaport and all the new construction is nice for a lot of folks, but I'm not sure how good it is for the guys on the wharf," said Bobby McGrath, the food market's operations supervisor. "We can feel the redevelopment creeping closer and closer."

The food market is a bustling industry in its own right. Every day, tens of thousands of pounds of meat, poultry, and seafood move through its warehouses, and chances are most restaurant patrons in Boston have dug into a ribeye steak or savored fresh lobster

supplied by one of its vendors. It employs about 700 workers and anticipates that revenues in 2014 will approach $1 billion.

DAVID L. RYAN/GLOBE STAFF

The 20-acre site of New Boston Food Market, where meats and seafood are prepared for restaurants and supermarkets.

Though surrounded by other dowdy industrial sites, their second home is now hugely valuable; the assessed value alone of the three connected parcels owned by New Boston Food Market is $21 million.

The Olympics group, which calls itself Boston 2024, could make an offer for the property, but a sale would require unanimous approval of the cooperative's 18 shareholders, said Jeffrey Corin, president of New Boston Food Market.

His snap assessment is that the shareholders would not be eager to sell.

As a private entity, the Olympics group lacks the authority to force out the wholesalers if they refuse to sell. However, the city could take the properties by eminent domain and allow Olympic organizers to build an arena there, as it did 45 years ago when it

cleared the meatpackers out of Quincy Market.

A spokeswoman for Mayor Martin J. Walsh said it is too early to discuss a land taking, with so many hurdles for Boston to clear to be named the Olympic host.

The Boston 2024 committee includes some of the city's most prominent business leaders, including construction magnate John Fish, Putnam Investments head Robert Reynolds, former Massachusetts economic development chief Dan O'Connell, and Bain Capital managing director and Boston Celtics co-owner Steve Pagliuca.

The committee declined to discuss the Widett Circle property and its owners' concerns.

"No final decisions have been made with respect to any of the venues for the proposed 2024 Games in Boston," Boston 2024 executive vice president Erin Murphy Rafferty said in a statement.

"Should Boston 2024 move on to the next phase, there will be a full community review process before any final decisions are made. We are committed to working with any potentially impacted neighbors in a full and transparent manner if and when we move forward in the process."

If the city decided to take the vendors' second home, too, there would be little they could do besides sue for maximum compensation, said Joel Faller, an attorney with McLaughlin Brothers in Boston, a law firm specializing in eminent domain.

"A land owner having their property taken by eminent domain can challenge whether it's for a public purpose, but it's very likely that this would survive a legal challenge," Faller said. "The courts give great deference to public authorities to determine what's a public necessity."

New Boston Food Market vendors are accustomed to being asked about their property. Private developers periodically approach the vendors about selling, Corin and Kaiser said, but the answer is always the same: Not interested.

And in 2001 the Massachusetts Bay Transportation Authority considered taking the land by eminent domain to build a warehouse for storing trains but quickly dropped the idea when then-mayor Thomas M. Menino objected.

"We're usually able to shrug it off," said food market property manager John Kennedy. "But this time feels different."

Boston is one of four US cities — along with Los Angeles, San Francisco, and Washington — on the US Olympic Committee's short list of prospective hosts for 2024. The committee is expected to pick one early next year but could still decide not to bid for the Games at all.

Even if Boston were to gain the US Olympic Committee's backing, it would still need to beat out several cities on other continents in an international selection process that will produce a winner in 2017 — seven years before the Games. In all that time, Olympic planners could pick another site for the stadium.

Corin, who is also president of Robbins Beef Co., said even the uncertainty about the future of the property makes it difficult to plan for upkeep and new projects.

Corin said the New Boston Food Market should be included in any talks about the city's Olympic bid.

"I think we are being left out a little bit, and I don't know why," Corin said. "Even if they don't have anything to say, it would be nice to be involved in the process. It's a little disconcerting."

More from today's paper

- **As Mark Wahlberg seeks a pardon, some aren't ready to forgive**
- **In D.C., Charlie Baker makes his case**
- **Accused smuggler brought to Boston**
- **Big challenges loom for Ashton Carter at Pentagon**
- **Pipeline plan rerouted from many Mass. towns**

Callum Borchers can be reached at callum.borchers@globe.com. Follow him on

TheChamber®
Greater Boston Chamber of Commerce
Connect & Grow.

December 17, 2014

Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
MEPA Office, Attn.: Holly Johnson, EEA # 15028
100 Cambridge St., Suite 900
Boston, MA 02114

Dear Secretary Bartlett:

On behalf of the Greater Boston Chamber of Commerce, I submit this letter of support for the South Station expansion project. The Chamber is a broad-based association representing more than 1,500 businesses of all sizes from virtually every industry and profession in our region. Based on the findings in the Draft Environmental Impact Report, we respectfully request the issuance of a Massachusetts Environmental Policy Act (MEPA) Certificate for this project by December 31, 2014.

An expanded South Station will increase rail connections to the west of Boston, to the South Coast, and to Amtrak destinations throughout the Northeast. It will promote expansion of Silver Line services, which connect Boston neighborhoods, employment centers, and Logan airport and it will facilitate new waterfront development along the Fort Point Channel.

In a report issued last December, the Chamber recommended that Greater Boston's business leaders and local government leaders work with state and federal officials to secure South Station's expansion. When completed it will transform public transit in Boston, and make new regional connections possible. This project will assure that key economic centers in Boston are not strained due to congestion and lack of appropriate access for a commuting workforce.

The Draft Environmental Impact Report details the environmental impact of the South Station expansion projects and identifies alternative build plans and mitigation proposals. Furthermore, MassDOT will continue working towards a final Environmental Impact Report (FEIR) and will prepare an Environmental Assessment (EA), which will allow for further review and public comments on the projects and its environmental impact.

The Chamber sincerely thanks the Executive Office of Energy and Environmental Affairs for considering our support of this important transportation project. Should there be any questions, or need for additional information, please contact me directly or Erin Trabucco, Senior Policy Advisor at 617-557-7344 or etrabucco@bostonchamber.com.

Sincerely,

Paul Guzzi

Paul Guzzi
President and CEO

MASCO

MEDICAL ACADEMIC AND SCIENTIFIC COMMUNITY ORGANIZATION, INC. | *People / Places / Plans / Future*

December 23, 2014

Secretary Maeve Vallely Bartlett
Attn: Holly Johnson
MEPA Office
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: Comments on the Draft Environmental Impact Report for the South Station Expansion Project (MEPA #15028)

Dear Secretary Bartlett:

I am writing on behalf of the Medical Academic and Scientific Community Organization (MASCO) in response to the South Station Expansion Project Draft Environmental Impact Report (DEIR). MASCO is a non-profit which serves 21 member organizations in the Longwood Medical and Academic Area (LMA) neighborhood of Boston which is the destination of over 100,000 patients, visitors, students, and employees each day. MASCO provides employee shuttle bus service between the LMA and the commuter rail network serving South Station through connections to Yawkey Station, Ruggles Station, and JFK/UMass Station. Over 50% of the employees in the LMA rely on commuter rail service and other forms of public transportation for their trips to work.

We strongly support the plan to expand South Station. It would provide benefits to both the LMA and the metropolitan region as a whole. Construction of additional tracks and platforms at South Station will improve on-time performance; facilitate increased commuter rail service on the existing commuter rail lines and enable future expansion of the system.

We request that the Final Environmental Impact Report (FEIR) evaluate the potential impact that the added non-revenue trips between South Station and the planned layover facility at Beacon Park Yard will have on commuter rail service along the Worcester/Framingham Line and identify ways to mitigate any impacts. Thank you for your consideration of our comments. If you have any questions, please contact me at (617) 632-2778. 19.1

Sincerely,

Paul Nelson
Senior Transportation Planner, Area Planning and Development

Member Institutions
Beth Israel Deaconess Medical Center
Boston Children's Hospital
Brigham and Women's Hospital
Dana-Farber Cancer Institute
Emmanuel College
Harvard Medical School
Harvard School of Dental Medicine
Harvard School of Public Health
Isabella Stewart Gardner Museum
Joslin Diabetes Center
Judge Baker Children's Center
Massachusetts College of Art and Design
Massachusetts College of Pharmacy and Health Sciences
Massachusetts Department of Mental Health
Simmons College
Temple Israel
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375 Longwood Avenue / Boston, MA 02215-5328 / Tel:617.632.2310 Fax: 617.632.2759

MASCO™

MEDICAL ACADEMIC AND SCIENTIFIC COMMUNITY ORGANIZATION, INC. | *People / Places / Plans / Future*

cc: Sarah Hamilton, Vice President, Area Planning and Development
Frank DePaola, Acting Secretary, MassDOT
David Mohler, MassDOT
Matthew Ciborowski, MassDOT

375 Longwood Avenue / Boston, MA 02215-5328 / Tel:617.632.2310 Fax: 617.632.2759

SIERRA CLUB
FOUNDED 1892
Massachusetts Chapter

#5

December 22, 2014

RECEIVED
DEC 23 2014
MEPA

MEPA Office
Attn: Holly Johnson, EEA# 15028
100 Cambridge Street, Suite 900
Boston, MA 02114

Dear Ms. Johnson:

I am writing on behalf of the Massachusetts Chapter of the Sierra Club as Chair of its Transportation Committee, in response to the South Station Expansion Project Draft Environmental Impact Report (DEIR) recently issued by MassDOT. While there are some aspects of the proposal that we find of merit—most notably, the reopening of the Dorchester Avenue bridge to the public to better link Downtown with South Boston, and the associated rebuilding of the adjacent streetscape and extension of the Harborwalk along Fort Point Channel—we deem the overall project fundamentally flawed by its basic design assumptions, rendering it incapable of providing a permanent solution to the problem of the Station's congestion so long as it remains a stub-end terminal. I attach the Chapter's Resolution on South Station Expansion, passed by our Executive Committee at its May 2014 meeting.

Absent from the DEIR is any recognition that building yet more dead-end tracks into South Station would be, at best, a temporary solution—one that will likely be eclipsed once again by the anticipated growth in passenger traffic. MassDOT should revisit, instead, its long-shelved plans for a direct rail connection between South and North Stations, which would allow for the through running of Amtrak and commuter trains without the wasteful backup moves that are now a major cause of congestion, and without the air and noise pollution at both terminals caused by the idling diesel locomotives.

A DEIS for the Rail Link was completed in June 2003 and immediately dropped by the Romney Administration, citing cost estimates that many of the proponents of the direct rail connection argue were inflated, and ignoring the operational and fiscal benefits of that project. At this time the Massachusetts Transportation Bond Bill includes $2 million designated for completing work on the North/South Rail Link environmental studies. We contend that these important studies should be completed before any South Station Expansion Project expansion be allowed to proceed.

After a long post-World War II decline that had reduced its capacity from 28 tracks to 10 and brought it perilously close to demolition during the late 1960s, South Station was finally acknowledged as Boston's preeminent ground transportation hub, and its headhouse was restored and rebuilt two decades later. It was then expanded in the mid 1990s with the addition of several tracks and platforms to accommodate new commuter rail services to the South Shore and Worcester, and by construction of the city's new bus station. Currently the Commonwealth is planning to increase yet again the capacity of this busy terminal by taking the South Postal Annex and putting at least seven more tracks on its site, for a total of 20 tracks and 11 platforms. The Commonwealth touts the project as "[a] rare chance to remove a major chokepoint and unlock greater regional mobility and growth." The planned extensions of commuter rail service to Fall River and New Bedford, and expansion of the existing service to Worcester, are being used to drive this project.

In April 2013 the Chapter submitted its comments on MassDOT's recently released Environmental Notification Form (ENF) for the South Station Expansion project. In addition to the proposal's unexamined assumption that the operational problems encountered by a congested, growing terminal could simply be resolved by adding yet more tracks and platforms, we criticized several other aspects of the proposal. A layover yard to store and service train sets would be sited in one of three locations adjacent to heavily populated Boston neighborhoods —Widett Circle between South Boston and the South End, Beacon Park Yard in Allston, or Readville-Yard 2—and trains

20.1 would shower yet more fumes and particulates on the city's residents. Abutters to any layover yard would also be subjected to the constant noise of the locomotives, especially from overnight idling during the winter months. We
20.2 argued that the MBTA should instead reconsider its decision of several years ago not to begin electrifying its commuter rail lines, which would reduce air pollution most particularly near any layover facility and in adjacent neighborhoods that now suffer some of the worst air quality in the Commonwealth.

20.3 The DEIR also glosses over the operational issues of a large terminal with many stub-end tracks and limited space for an adequate "throat" of tracks and switches connecting the platforms with the approach tracks from the west and south, and with the Southampton Street yards. Incredibly, it seems to believe that this project will have a
20.4 negligible—or even slightly beneficial—effect upon the air quality in and around South Station (page 1-10). Yet the "Maximum Build" option for this project would entail construction of several high-rise office and apartment buildings adjacent to and above the site. Already, commuter trains (whose locomotives are pointed away from the terminal) must stop far from the headhouse to avoid concentrating the diesel fumes due to the bus station directly above the tracks, forcing passengers to walk a long distance to and from their trains. The proposed air rights development would likely concentrate pollution in the platform area, making it even worse than the conditions that currently exist in Back Bay Station. Air quality alone might impel electrification, for the sake of the commuters and the surrounding neighborhood.

Similarly, the DEIR's chapter "Response to Comments on the ENF" ignores the substance of the Chapter's criticisms. While it at least acknowledges our observation that the project would have no benefit for travelers coming into Boston from the north, it sidesteps our contention that it would provide at best a temporary benefit to travelers from the south, until the terminal once again becomes congested due to the projected growth of traffic (pages 9-274, 9-275). Also lacking was any acknowledgement of the benefit of having our commuter and passenger rail function as one unified system providing through service from one side of the metropolitan area to the other and allowing the better distribution of passengers throughout the downtown core, particularly if an intermediate commuter rail station is built in the vicinity of State Street. The Rail Link's 2003 DEIS had estimated that it would take about 50,000 cars off the region's highways, also diverting thousands of commuters from our overstressed subway system (especially from the Orange Line).

We believe that a far more responsible approach to expanding South Station would be to put its new platforms underground, allowing the tracks to be extended north at a later date. While the proponents of the present expansion proposal claim it is an "incremental" improvement (page 9-274) and deny that it would preclude later construction of the Rail Link, the high cost of what critics have called a "billion dollar band-aid" might well prevent the Link from ever being built. Regrettably, voters in November voted to repeal the indexing of Massachusetts' gas tax to the rate of inflation, a move that will create an estimated $1B gap in the Commonwealth's transportation budget over the next decade. That prospect, however, provides us with the opportunity to reevaluate what proposals make economic and operational sense—and which do not. By this standard, the current plan for South Station is severely deficient.

Respectfully submitted,

John Kyper, Transportation Chair
Sierra Club, Massachusetts Chapter
jkyper47@gmail.com

Enclosure

SIERRA CLUB
FOUNDED 1892
Massachusetts Chapter

Chapter Resolution on South Station Expansion.

The Massachusetts Chapter of the Sierra Club is opposed to the expansion of South Station as a stub-end terminal as currently proposed. Completely absent from the present plan is any recognition that building yet more dead-end tracks into South Station is, at best, a temporary solution—a "billion dollar band-aid"—that will be eclipsed, once again, by the anticipated growth in rail passenger traffic.

Instead, MassDOT must revisit its long-shelved plans for a direct rail connection between South and North Stations that will allow for the through running of Amtrak and commuter trains, eliminating the wasteful backup moves that are now a major cause of congestion at both terminals. A first step is to build underground station platforms at South Station as Phase 1 of the North-South Rail Link, thereby accommodating service on Amtrak's electrified Northeast Corridor while allowing the tracks to be extended north at a later date.

The current proposal, moreover, fails to address the issues of greenhouse gas emissions and climate change, the central challenge of our time. We must make bold moves that had heretofore seemed beyond our means, which would maximize reduction of these emissions while creating more efficient transportation options. According to its DEIR Summary written a decade ago, the Rail Link would result in over 55,000 auto trips diverted daily onto public transportation. An expanded South Station *with* a connection to North Station would be more efficient—and less polluting—than the current plan.

Approved by Sierra Club Massachusetts Chapter Executive Committee

May 18, 2014.

FREC

Fidelity Real Estate Company

currently provided. No alternative has been suggested that we are aware of. Additionally, we have been informed that "all truck maneuvering would occur off street." We ask the project to provide clarification and inform us how our existing delivery requirements will be met without impacting the surrounding environment. 24.3

Ground Water

We are very concerned what impacts the proposed changes will have to ground or salt water. It is unclear in the documents that a study has been completed regarding this topic. We have critical infrastructure below grade in 245 Summer Street which is sensitive to moisture. Therefore, we ask the project to provide us detail on the risks associated with changes to the surrounding landscape. 24.4

We look forward to a deeper understanding of the many ways the proposed projects impact our building, our operations and our employees.

Regards,

Jeff Cook
Vice President

Fidelity INVESTMENTS

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December 22, 2014

VIA OVERNIGHT MAIL AND EMAIL
Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
MEPA Office, Attn.: Holly Johnson, EEA # 15028
100 Cambridge St., Suite 900
Boston, MA 02114

Re: *Boston*
South Station Expansion Project
EEA #15028

Dear Secretary Bartlett:

James G. Grant Co., LLC ("Grant") has reviewed the October 2014 Draft Environmental Impact Report ("DEIR") submitted by the Massachusetts Department of Transportation ("MassDOT") concerning the above-referenced matter, and offers these comments concerning the proposed layover facility at Readville – Yard 2. Grant requests that the issues identified below be addressed by MassDOT before the project moves forward.

James G. Grant Co., LLC And Proposed Property Taking

Grant is located at 28 Rear Wolcott Street in Readville (Boston), Massachusetts, which abuts the Readville – Yard 2 proposed location for a layover facility. Overall, Grant's property is comprised of approximately 7.9 acres. In order to construct the proposed layover facility at Readville – Yard 2, MassDOT would have to take .7 acres of Grant's property in Readville. Grant has conducted scrap metal yard operations at this location since 1955. Grant also performs off-site demolition, storage tank dismantling, and operates transfer station facilities for construction and demolition ("C&D") waste, wood waste, yard waste, and tires. Other activities at the facility include heavy equipment and roll off container rentals. Grant services all of New England, and critically is one of only two C&D facilities located in Boston, as discussed further below.

*ALSO ADMITTED IN NY
**ALSO ADMITTED IN NH
*ALSO ADMITTED IN DC
**ALSO ADMITTED IN RI, CT, NH & ME
***ONLY ADMITTED IN PA
***ALSO ADMITTED IN RI, CT, & NH
****ALSO ADMITTED IN RI

The cost of the necessary taking associated with Readville – Yard 2 has not been identified. Readville – Yard 2 is the only proposed layover site that necessitates a taking. The impacts of that taking should be further explored, both in terms of costs and impacts to long-term employment as well as related environmental consequences, as discussed further below.

The Readville – Yard 2 Layover Will Have A Direct Negative Impact On Long Term Employment In The Community As Well As Related Environmental Impacts

The DEIR states that no long term loss of employment will occur as the result of taking .7 acres from Grant, necessary to construct the Readville – Yard 2 Layover. This statement is unsupported and inaccurate, however, and should be more rigorously addressed. Taking of .7 acres of Grant's property – nearly ten percent of its property – will force Grant to greatly downscale its operations or cease operations altogether. A successful C&D and waste business, such as Grant's, requires sufficient land to conduct its operations. Removal of 10% of its land will force Grant to curtail its operations – there is simply no room to move its operations elsewhere on its property. Further, it is tremendously difficult to site a waste and transfer business; Grant cannot locate a suitable replacement site in the vicinity. Even if such a site were able to be located, Grant has expended considerable resources to design its facility to address unique components and features of its current, long-term location; any move to a different site would be financially impossible at this time. 25.1

Grant's employees receive special training to handle waste materials and to detect unacceptable wastes. These skills are specific to C&D transfer businesses and cannot be utilized elsewhere. Should Grant's operations be shut down, these employees would have to acquire new marketable skills in order to gain new employment elsewhere. The risk of long term loss of employment as the result of constructing the Readville – Yard 2 layover facility is significant.

Curtailing Grant's operation will have repercussions throughout New England. Grant handles much of greater Boston's C&D waste, and is a clean, well-maintained, environmentally sound state-of-the-art facility. If Grant curtails or ceases its operations, C&D waste generated by the city and region will have to be trucked and disposed of, at great expense, in landfills outside the region and state. Those costs would increase operating expenses for contractors, both large and small, and would eventually be passed along to consumers. If a suitable facility cannot be found within reasonable transportation distance, the waste may be dumped illegally.

In 2006, the Commonwealth passed regulations that banned the disposal of specific commonly-used C & D waste materials including asphalt pavement, brick, concrete, metal, and wood. That ban is significant because those materials must now be recycled. Consequently, this has and will continue to increase the volume of debris that needs to be recycled, thereby creating a demand for additional handling facilities in Boston. It is critical that Grant continue to operate at full capacity in order to ensure that there is sufficient recycling capacity to meet the city's and region's growing needs.

Ultimately, should the property by taken and Grant curtail its operations, Grant will be forced to downsize or eliminate its employee force. Such a business curtailment would have far-reaching environmental ramifications across the region. While the DEIR states that no long term loss of employment will occur, this analysis is quite flawed and should be studied more thoroughly.

The Proposed Readville – Yard 2 Layover Site
Will Cause Significant Negative Impacts To The Community

The proposed Readville – Yard 2 Layover site is located nearly 9 track miles from South Station at the southernmost point of the city, the farthest of any of the proposed layover sites. Trains utilizing the layover facility would travel the farthest of any of the proposed sites, emitting pollution – including noise pollution – for a far longer journey and through more communities than other proposed layover facilities. This longer trip will also cause more wear and tear on the trains at issue. Further, additional lengthy "deadheading" will occur in order for the quantities and locations of trains and employees to reach equilibrium, having an adverse impact on the traversed communities as well as employees.

Moreover, the Readville – Yard 2 layover site can accommodate the fewest eight-car trainsets of all of the proposed layover sites – only eighteen. This size may be insufficient for long term planning and growth, and should be further explored. At the very least, because the layover site can accommodate the fewest trains, there will be more train traffic at the Readville – Yard 2 layover facility. The relationship between the small size of the proposed yard and its impact on the surrounding community should be fully studied, particularly because the proposed Readville – Yard 2 layover site is located in close proximity to a single-family residential district zone. This single family residential area will bear the brunt of the impacts of the proposed layover. 25.2 25.3

The DEIR Has Identified Many Unknown Factors Relating
To The Readville – Yard 2 Site That Must Be Further Studied

According to the DEIR, there remain many unknown factors with respect to the proposed Readville – Yard 2 layover site that should be further studied prior to any decision being made. Importantly, while the DEIR correctly states that the Readville – Yard 2 site contains wetlands areas, no determination has yet been made as to whether or not the wetlands are protected jurisdictional areas necessitating further permitting and design work. The DEIR states that more delineation and assessment work must be conducted in order to determine whether or not certain wetlands areas fall within the scope of the Massachusetts Wetlands Protection Act. Similarly, the site lies within the 100-foot buffer zone and 25-foot riverfront area as defined in the Massachusetts Wetlands Protection Act and associated regulations. The proposed project must be designed to conform to performance standards contained in the Massachusetts Wetlands Protection Act and its associated regulations, where applicable. These issues have not been addressed by the DEIR. Further study should be conducted at this time in order to obtain 25.4

necessary data to define the extensive wetlands permitting that may be required to develop a layover at this site. At this time, the proposed project cannot be properly evaluated due to the lack of data concerning wetlands and riverfront issues.

Further, the scope of drainage pipes at Readville – Yard 2 is unknown. Underdrains at the site discharge to the Neponset River, which is already impaired. The current conditions of those drainage pipes are unknown, and more evaluation is needed in order to determine necessary design issues. These drainage issues should be fully addressed. 25.5

Similarly, according to the DEIR, the age, condition, and size of several water pipes and sewer pipes servicing Readville – Yard 2 are unknown. Design elements and mitigation factors will depend upon the conditions of these services, and should be studied further at this time. 25.6

Overall, there are numerous unresolved issues at Readville – Yard 2. It is impossible to fully and comprehensively evaluate the impacts of the proposed layover absent a full understanding of wetlands, drainage, and water and sewer issues. These issues must be addressed by MassDOT.

The Proposed Readville – Yard 2 Layover Site Will Have Negative Environmental Consequences That Have Not Been Fully Addressed

The proposed Readville – Yard 2 Layover site has numerous environmental issues that necessitate further study. There is currently an open Release Tracking Number ("RTN") pursuant to the Massachusetts Contingency Plan related to the site. Therefore, according to the DEIR, construction on the site would require both a Licensed Site Professional and a soil management plan until such time as a permanent solution is reached with respect to the open RTN. The impacts of these environmental issues have not been fully addressed by the DEIR. 25.7

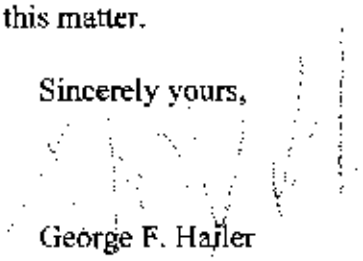
Further, the proposed site lies within the Neponset River Riverfront Protection Overlay District. Additional design elements will be required to construct the layover at this proposed location in order to comply with the demands of the overlay district. 25.8

It is clear that air quality impacts, in the form of noise pollution and other air pollution, will occur as the result of utilizing the site as a layover facility. The Readville – Yard 2 layover site would generate noise that would exceed FTA moderate impact criterion, necessitating further study and installation of noise barriers. Similarly, the layover facility would create further regulated air emissions, particularly in light of additional traffic generated by the distant location of the proposed site. The neighborhood in the immediate vicinity will bear the brunt of these impacts. Traffic will also increase in the area, negatively impacting the neighborhood including the single family residential district.

Overall, the DEIR's analysis of environmental issues with respect to the proposed Readville – Yard 2 layover site is not sufficiently comprehensive, and should be further addressed. 25.9

Grant appreciates the opportunity to comment on the proposed Readville – Yard 2 Layover. Thank you for your attention to this matter.

Sincerely yours,



George F. Hafler

RELATED BEAL

December 23, 2014

Ms. Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
MEPA Office, Attn: Holly Johnson, EEA# 15028
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: DEIR regarding South Station Expansion Project – EEA No. 15028

Dear Secretary Bartlett:

I am writing in support of Michael Dukakis's recent letter to you in respect to the South Station Expansion Project. I agree with Governor Dukakis that the report is flawed and should be rejected. Most important, we need to focus on connecting the North and South stations to resolve the growing congestion by the fact that North and South stations are not connected by rail link. 26.1

Again, as Governor Dukakis pointed out, 160 out of 200 Massachusetts legislators have endorsed the North South rail link and voted for funds to complete the preliminary planning. We must proceed with the North-South Rail Link.

Sincerely,

Robert L. Beal

RLB:dah

cc: Michael S. Dukakis

Brad Bellows Architects 87 Howard Street Cambridge MA 02139 tel: 617.661.4500

December 24, 2014

Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
MEPA Office, Attn. Holly Johnson, MEPA Analyst
EEA #15028
100 Cambridge Street Suite 900
Boston MA 02114

Dear Secretary Bartlett,

While I commend the Patrick Administration's stated interest in expanding rail capacity, it is very clear that current plans for the expansion of surface tracks at South Station represent a major blow to the kind of efficient and integrated rail infrastructure we desperately need.

According to the DEIS itself (section 2.3.1), the key issue at South Station is that "*every arriving train must be reversed to either leave the station as a new revenue trip, or to access a layover facility. This means that every arriving trip is linked to a departing trip, further limiting station capacity."* It is more than obvious from this succinct summary that adding a few more tracks will do nothing to address this core problem. On the contrary, enlarging a stub-end terminal simply multiplies the inefficiency, and transfers additional acres of valuable downtown land to railroad uses – 7.6 acres more at South Station alone. The same inefficiencies that are choking South Station also loom at North Station. Are we to expend similar sums expanding stub-end service at North Station as well, only to face the same crises, just a few years hence, at both?

There is no doubt that additional rail capacity is urgently needed, but the only sensible, effective, and durable way to provide it is to replace inherently inefficient stub-end service with the kind of run-through service we take for granted on our rapid transit lines. That this most obvious solution was not included in the SSX DEIS is nothing short of astonishing. Linking North and South Stations will not only resolve all of the capacity constraints at both stations far into the future, while reducing the footprint of rail uses in the center city, it will also knit together our region as no other transportation investment can. 27.1

If adding a few more surface tracks were inexpensive, and bought us a few years to organize a more definitive solution, then perhaps it could be justified. But, with a price tag now approaching a billion dollars, the SSX will severely undermine our ability to make more enlightened investments in the same location. Even more concerning than the financial implications are the structural conflicts the SSX threatens to place in the path of both of the currently identified Rail Link alignments. The SSX's air rights developments are located directly above major parts of the NSRL Atlantic Avenue and Dorchester Avenue alignments. Absent careful structural coordination, these structures may well be nails in the coffin for rail integration in Massachusetts - the very antithesis of the enlightened planning that has done so much to make Boston and the Commonwealth great, and a poor legacy for the officials responsible. 27.2

There is a misconception in some quarters that the Rail Link was studied and found to be infeasible. In fact, several groups of senior engineers and project managers with broad international experience who evaluated the project in the early and mid-nineties, came to the opposite conclusion: that the project was technically feasible, and could be built at reasonable cost. That these recommendations were ignored says more about the panic that accompanied burgeoning CAT/P cost overruns, and the inability of the sponsoring agency (the MBTA) to contemplate any significant capital investments, than it does about the virtues or feasibility of the NSRL Project. In fact, the Rail Link needs to be seen and funded not as a Boston project, or even a Massachusetts project (though of course both will be the greatest beneficiaries of it), but rather as national and New England-wide project, extending Northeast Corridor service to the north of Boston, into Maine, New Hampshire and Vermont.

Before we now take the definitive step to massively invest in a stopgap that fails to address our long term local and regional needs, we owe it to ourselves and our partners to make sure we are not precluding a better and more cost-effective solution. At minimum, a proper cost / benefit analysis of a North South Rail Link needs to be completed, giving due credit for the savings of not having to expand South Station, for the surface land no longer required for rail uses, and for the operating savings of a run-through system, all of which were excluded from prior reviews – not to mention the regional economic benefits and joint development opportunities. 27.3

Until such a cost / benefit analysis has been done, as it should have been done in the SSX DEIS, it is premature and even negligent to commit public funds to any alternative that provides significantly fewer benefits and precludes better solutions. Now that the true cost of adding surface platforms at South Station has been established, the advantages of an underground link will only be more compelling.

In recognition of this, the Massachusetts Legislature included $2 Million in the 2014 Transportation Bond Bill for the completion and updating of prior North South Rail Link analyses. We have a new Mayor in Boston, and will shortly have a new Governor. I strongly urge the Secretary and Governor Patrick to refrain from any steps that will compromise the realization of integrated rail service in Massachusetts, as current expansion plans at South Station appear certain to do.

Respectfully,

Brad Bellows
Architect
Member Citizens Advisory Committee for the North South Rail Link, 1996-2003
Member, Central Artery Task Force, 1993

While I commend Governor Patrick for recognizing the vital role that improved commuter rail service must play if we are to create sustainable economic growth, I regret that the current plan for South Station expansion will, if implemented, ultimately compromise this goal. Yes, the expansion of surface tracks will address a very real and immediate capacity issue, and allow modest increases in rail service, but those surface tracks and additional platforms would not be needed if our rail service were properly integrated, with run-through service, just as they are not needed in our rapid transit stations that serve far more people.

Large parking lots for trains are an obsolete artifact of the piecemeal way in which our rail system was built, by private companies, each serving a specific market, with no regard for regional integration. We inherited this system and have not improved it in a hundred years. Expanding South Station may restore part of what we have allowed to actually erode, but it certainly will not give us the twenty-first century system we need. If a short term expansion was inexpensive, and bought us a few years to organize a more definitive solution linking North and South Stations, then it might be quite justified. But, with a price tag approaching a billion dollars, the SSX project clearly represents the final nail in the coffin of any such plans, assuring that we never have the rail service we need. Sometimes "the perfect is the enemy of the good", but in this case, a shortsighted solution is the enemy of the necessary.

A bold transportation plan should turn the clock forward, not back to the nineteenth century, as this plan proposes to do. The North South Rail Link Project, studied in the late 1990's and early 2000's, under the shadow of ballooning CAT/P costs, would reduce the need for surface platforms at

both South and North Stations, while lowering operating costs and dramatically improving service. By the relatively simple act of linking the assets we already own, it would give us, in one stroke, one of the premier regional rail systems in the world, allowing our commuter rail service to operate much like a rapid transit system, making the greater Boston region vastly more accessible for employers and workers across the region, who are currently suffering the costs of gridlock and will receive only limited relief under the current SSX plan.

There is a widely held misconception that the Rail Link was studied and found to be impractical, on either technical or economic grounds, or perhaps both. In fact, a Peer Review committee, convened in the mid-1990's, composed of senior engineers and project managers with broad international experience, concluded the opposite: that the project was eminently feasible, and could be built at reasonable cost. That this recommendation was ignored says more about the panic that accompanied CAT/P cost overruns, and the inability of the sponsoring agency (the MBTA) to contemplate any significant capital investments, than it does about the virtues or feasibility of the NSRL Project. In fact, the Rail Link needs to be seen and funded not as a Boston project, or even a Massachusetts project (though of course both will be the greatest beneficiaries of it), but rather as national and New England-wide project, extending Northeast Corridor service to the north of Boston, into Maine, New Hampshire and Vermont. Had Governor Romney taken the lead in forging a regional rail coalition, we might have had a "shovel-ready" project when Stimulus funds were being disbursed a few years ago - but unfortunately this did not occur.

Before we now take the definitive step to massively invest in a short-term solution to our long-term needs, we owe it to ourselves to make sure we are not precluding a better and more cost-effective solution. At minimum, this should include a proper Cost / Benefit analysis of the North South Rail Link Project - something that was never actually done. Rather, NSRL costs were escalated by layers of “escalation factors", while most of the undisputed benefits were never quantified, even when it would have been relatively easy to do so. The cost of South Station expansion, for example, was discussed, but not included as a cost of the No-Build Option. The NSRL cost estimates are also significantly at odds with other rail projects in the US and around the world. Are we prepared to concede that Massachusetts cannot accomplish what our competitors can? NSRL cost estimates should be verified against current global "best-practices".

Until a proper Cost / Benefit analysis has been done, it is highly irresponsible to commit public funds to any alternative plan that provides significantly fewer benefits. Now that the true cost of adding surface platforms at South Station has been established, the advantages of an underground link will only be more compelling. The time has come to cut our Gordian Knot, not enlarge it.

Johnson, Holly (EEA)

From: Adam Castiglioni [acastigl_99@yahoo.com]
Sent: Wednesday, December 24, 2014 11:31 AM
To: Johnson, Holly (EEA)
Subject: South Station expansion

Dear Ms. Johnson,

I would like to go on record in support of the South Station Expansion project.

I feel it is critical to expanding commuter rail, intercity rail service via Amtrak, and expanding the economy of Boston. I would love to see faster high speed rail to NYC and points south as well as expanded public transit here in Boston.

Thank you.

Sincerely,

Adam Castiglioni

Check out my blog:

http://www.bostonhospitalityindustry.com/

Follow me on Twitter:
@Conciergeboston

Johnson, Holly (EEA)

From: Frank S. DeMasi [fsdemasi@verizon.net]
Sent: Monday, December 22, 2014 6:12 PM
To: Johnson, Holly (EEA)
Subject: Comments on south station DEIR
Attachments: South Sta DEIR.pdf

Dear Holly,

At the attachment find my comments on the south station DEIR.

Regards,

Fank DeMasi

FRANK S. DE MASI 26 MAC ARTHUR ROAD, WELLESLEY MA 02482

December 22, 2014
Secretary Maeve Vallely Bartlett,
Executive Office of Energy and Environmental Affairs
MEPA Office,
Attn.: Holly Johnson, EEA # 15028
100 Cambridge St., Suite 900
Boston, MA 02114

Dear Secretary Vallely Bartlett
Ms Holly Johnson

Thank you for considering my comments on the south station Expansion DEIR. As a member of the Association for Public Transportation, I support the South Station Expansion alternative of a North/South Rail Link. I believe a summary of the findings of the MBTA North South Rail Link Draft EIR/EIS/MIS should be included and considered in the Draft Environmental Impact Report (DEIR) for the south station expansion. I believe MassDOT should not have withdrawn its sponsorship of the project in May 2006, due to its perception that the capital cost (projected at several billion dollars), was prohibitive. The April 2007 document *JOURNEY TO 2030: Transportation Plan of the Boston Region Metropolitan Planning Organization* says "the MPO feels that a study of the right-of-way requirements should be conducted for preservation of that right-of-way so as to not preclude this project's going forward in the future."

In December 2007, the Federal Railroad Administration was interested in funding this project if the Massachusetts Executive Office of Transportation was interested in sponsoring it. As of August 2009, the project was brought back into the spotlight as a component of the New England transportation plan, a coordinated effort by the six New England states to improve rail transportation infrastructure by competing for the $8 billion dollars allocated for high speed rail in the American Recovery and Reinvestment Act for 2009 indicating strong support exists for this vital link to the NEC and MBTA commuter rail lines. As a result of continuing legislative and public support for the North South Rail link and the positive impact the link would have on mitigating the lack of expansion space for current and future regional and commuter rail track capacity EIR/EIS/MIS should be included and considered in the Draft Environmental Impact Report (DEIR) for the south station expansion.

As a member of the Eastern Massachusetts Freight Rail Coalition I would like to express my concern for the impact revision of interlocking and layover yards south of South Station may have on freight and passenger rail access to the port of Boston. There is growing concern regarding road congestion at the Port of Boston and the new Seaport District. The port has very limited freight rail access as a result of an

adverse rail connection at Bay Junction. The Boston Terminal running track that connects to Massport's track 61 requires freight trains of limited length to perform a back-up move to get into the port. The DEIR addresses relocating some of the interlocking at or near Bay junction and the MBTA and Amtrak South Hampton St yards requiring the consideration of critically needed track improvements for freight and passenger rail access to the port. Improvements for train access from the Fairmount line are especially needed coming north, from and across the Braintree Main line, at Bay junction. Direct access to the Boston terminal running track to the port is needed for trains coming south from the Y at South Station and along the reverse loop at Bay Junction. The south station interlocking and lay over yard improvements also provide an opportunity to improve port rail access and this need should be included in the DEIR. 29.1

Massport and the city of Boston have submitted Tiger Grants proposed to improve the port rail infrastructure. As many as 6,000 rail carloads a year could be brought into the port for bulk and other kinds of commodities, which would take 24,000 truckloads off our roads. I think it's very important to include in the DEIR provisions for maintaining and improving freight rail access to port at Bay Junction.

The Grand Junction connection to North Station should be considered in the DEIS as a mitigating factor for reducing the number of trains terminating at south station. A number of Inland Route, and MBTA commuter trains should be diverted from the Boston Line to Cambridge and North Station. I know we're going to add possibly 16 trains on the inland route to South Station as a terminus. Being a resident in Metro West, I know many people coming out from Worcester and Metro West would like to go to Cambridge and North Station. With the new West Station coming along and Diesel Multi Units planned for more local commuter trains I believe that a discussion of these initiatives and their positive impact on track capacity should be included in the DEIR. But of course, there will be a tremendous impact in Cambridge and the DEIR should evaluate the impacts as we take advantage of that Grand Junction Line.

Returning to a major concern for the logistics impacts on the port I believe the alternate site for the Postal Annex needs to be considered in the DEIR. There needs to be consideration for the impact to the port if the annex is to be moved into a designated port area or property within the seaport area. Massport needs as much lay-down area as it can get or retain for its planned expansion, for both trucks, container storage, and in the future rail cars. If the Postal annex is to be moved into the DPA consideration needs to made on its impact on related port operations. Thank you. 29.2

Frank S. DeMasi

Frank S., DeMasi
26 MacArthur Road
Wellesley, MA 02482

Johnson, Holly (EEA)

From: Dukakis, Michael [M.Dukakis@neu.edu]
Sent: Saturday, December 20, 2014 9:27 PM
To: Johnson, Holly (EEA)
Subject: Fw: Comments on DEIR regarding South Station Expansion Project- EEA NO. 15028

From: Dukakis, Michael
Sent: Saturday, December 20, 2014 8:51 PM
To: holly.s.johnson@state.ma.us
Subject: Comments on DEIR regarding South Station Expansion Project- EEA NO. 15028

Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
MEPA Office, Attn: Holly Johnson, EEA # 15028
100 Cambridge St., Suite 900
Boston, MA 02114

Dear Secretary Bartlett:

I am writing with comments with respect to the DEIR recently released regarding the South Station Expansion Project- EEA No. 15028.

Unfortunately, the report is fatally flawed and should be rejected out of hand.

A number of us tried to point out at the outset of this process that it was essential that the any environmental review of the proposed station expansion include an analysis of the North-South Rail Link as an alternative to station expansion which would solve the congestion problem at South Station without any need for station expansion. Regrettably, that was not done even as the likely cost of the station expansion is now five times its original estimate. 30.1

The report makes no mention of the fact that a serious congestion problem is now developing at North Station. Obviously, expanding South Station will have no impact on that problem. Connecting the two stations solves the problem on both ends.

Through service obviates the need for midday layup/layover facilities. There is no recognition of that fact in the DEIR. Moreover, by suggesting that such a facility might be located in the Beacon Park Yard, the report ignores the adverse impact that any such facility would have on plans for high speed rail connecting Boston, Worcester, Springfield, Hartford and New York-- a key part of Governor Patrick's proposed rail plan for the Commonwealth and New England. 30.2

In short, we have spent millions of dollars on a study that fails to consider the most obvious alternative to station expansion: connecting the two stations. Furthermore, the cost estimates for that project on which the Commonwealth continues to rely are patently absurd. Urban rail tunnels are being built all over the world. Their average cost is 900 million dollars a mile. Los Angeles has just awarded the contract for its downtown rail

connector. It is 1.9 miles long-- substantially longer than the North-South Rail Link. It includes three new stations. The winning bid was slightly in excess of $1.4 billion dollars.

The DEIR also ignores the fact that the North-South Rail Link will not only fully integrate our commuter rail system and take thousands of cars off the road every day with dramatic improvements in the metropolitan area's air quality. It also ignores the fact that connecting North and South Station by rail will make possible high speed rail service to northern New England and Montreal. Our Canadian neighbors are particularly interested in partnering with us on such service. Expanding South Station fails to achieve any of these goals.

160 out of 200 Massachusetts legislators have now endorsed the North-South Rail Link and voted for substantial funds to complete preliminary planning for the project. Their views are important and should not be ignored.

Michael S. Dukakis

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Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
MEPA Office, Attn.: Holly Johnson, EEA # 15028
100 Cambridge St., Suite 900
Boston, MA 02114
Fax: 617-626-1181

Dear Sec. Bartlett:

I am writing today to ensure that I maintain status as a commenter on DEIR (EEA #15028), so that I am provided every opportunity to receive information and comment in the future.

I support a number of objectives of the S. Station expansion project as described in the DEIR.

Please include me on the list of official commenters. 31.1

Thank you,

Steve Hollinger
Resident of Fort Point, South Boston
21 Wormwood St. #215
Boston, MA 02210
617 338-2222

ACTON
CHRYSLER DODGE JEEP RAM
CHRYSLER Jeep
DODGE RAM

December, 1 2014

Secretary Maeve Vallely Bartlett
Executive Office of Energy & Environmental Affairs
MEPA Office, Suite 900
Attn Holly Johnson, MEPA Analyst (EEA #15028)
100 Cambridge St.
Boston, MA 02114

Re: South Station expansion plans vs a modern rail link

Dear Secretary Bartlett,

I am writing to express my concern over the planning momentum involving the expansion of Boston's South Station. This analysis appears to be progressing with without a sufficient reconsideration of the far more elegant solution of an underground rail connection between North and South stations.

As you are aware, the NSRL has been debated for decades, but it may be even more relevant today than ever before in light of the renewed emphasis on rail emanating from Washington.

The cost & disruption of relocating the Post Office without thoroughly evaluating the potentially more effective approach of connecting our rail infrastructure will be significant, and may be an oversight that we regret long into the future.

As modern tunneling construction technology has become more efficient and widespread, the difference in the investment to build the NSRL versus above ground rail solutions has narrowed.

In my view the entire northeast transportation corridor would sustain broader benefits from connecting Boston's rail station system. I believe that this is the time to fully vet every option and that the NSRL merits a full review. 32.1

I urge you to consider the benefits of an underground strategy in your deliberations.

Coleman Hoyt
President

P.O. Box 2289 • 196 Great Road (Rt.2A) • Acton, Massachusetts 01720 • (978) 263-7300 • FAX (978) 264-9053
www.actoncdjr.com

SOUTH STATION EXPANSION

massDOT
Massachusetts Department of Transportation

Public Hearing – November 18, 2014
Comments on the Draft Environmental Impact Report

Comments on the South Station Expansion project may be submitted by mail, fax, or email until December 24.

Name: Ned Imbrie

Address/Email: ned_imbrie@yahoo.com

Please provide your comments below (use the reverse side for additional space).

The plan, no matter which alternative, should include noise abatement along Atlantic Avenue, particularly near and south of the Bus station entrance. The locomotives resting on Tracks 1 and 2 create a tremendous amount of noise pollution. Thank you

33.1

You may leave this comment sheet with project staff at the door or mail/fax/email it to:

Secretary Maeve Vallely Bartlett, Executive Office of Energy and Environmental Affairs
MEPA Office, Attn.: Holly Johnson, MEPA Analyst
EEA # 15028
100 Cambridge St., Suite 900
Boston, MA 02114
Fax: 617-626-1181
Email: Holly.S.Johnson@state.ma.us

Stephen H. Kaiser
191 Hamilton St.
Cambridge Mass. 02139

To : Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
100 Cambridge Street Room 900
Boston, Mass. 02114
Attention Holly S. Johnson

From : Stephen H. Kaiser, PhD

Comment on Draft EIR for South Station Expansion (SSX) EEA 15028

The South Station DEIR offers detailed information and justification for the alternatives and focus of the project. My comments shall concentrate on one aspect of the project and its EIR. MassDOT has identified insufficient service capacity for existing and future No-Build conditions, and has implied that the proposed changes at South Station will be sufficient to meet the capacity needs of transportation services in the vicinity of South Station. This presumption must be questioned.

The EIR considers numerous alternatives in terms of several variables : train length, seating capacity, number of bi-level cars, station platform loading limits, and South Station terminal flow-through capacity. All future alternatives must include consideration of both existing concerns with limitations on South Station operations, while also allowing for increases in MBTA and Amtrak ridership. The service challenge is solving both existing problems with operations and future challenges of increased ridership demand.

The EIR concentrates on the Amtrak/commuter rail perspectives, and gives lesser attention to issues outside but adjacent to South Station . These issues include pedestrian circulation to and from South Station (as well as within) and the quality of service and capacity offered by the Red Line and the Silver Line. My concerns are primarily with the Red Line and Silver Lines.

My basic question is this : what is the single weakest link in current South Station operations? Is it insufficient platforms? Not enough trains or cars? Is it the present or future Tower 1 Interlocking design? Or is it limits on passenger density on platforms or within the South Station concourse? Is it the shortage of layover space for commuter rail trains? Could longer trains be the answer? Or is it achieving improved on-time performance? Or could the ultimate limit at South Station be the peak hour overcrowding on the Red Line or Silver Line, especially when including intense development planned along the Red Line corridor?

The Draft identifies qualitatively almost all of these problems, but does not give the reader any sense of priority or expected degree of success if the project is completed as planned. The Final EIR should identify the key critical capacity limitations as they exist today, and as they might continue continue in the future with the new designs in place. 34.1

For train layover space, the EIR is clear about yard capacity needs for layovers. A more dynamic problem is posed by Tower 1 Interlocking whereby the addition of seven more tracks makes the design of the interlocking system far more challenging. One useful effort would be to look at the original South Station track plan of 1899 when close to 20 tracks existed. Was there an interlocking problem then, or did the old-timers have it solved? 34.2

Capacity and operations issues should be considered for both normal or average day operations, as well as response to severe disruptions, such as a blockage of the Tower 1 interlocking tracks. If a train breaks down at a platform, this represents a 5% loss in capacity. If a locomotive quits in the middle of the interlocking area, almost all of the trains and platforms become non-functional until the blockage is removed. What are worst case scenarios which MassDOT hopes to address? 34.3

Years ago, I learned that the deficiencies of Tower 1 Interlocking, referred to by knowledgeable old-timers as "Malfunction Junction." I am aware of at least one occurrence in the past several years when a disabled locomotive blocked the key tracks and switches and no trains could get through.

Will the use of more bi-level cars result in delays loading and unloading, as waiting passengers crowd the platforms near the two entrance doors to each car? Will future Amtrak and commuter rail passengers seeking to continue their trip encounter peak hour congestion and delays on the Red and Silver Lines? 34.4 34.5

The DEIR text does not provide ready answers to these concerns, although some of the answers may lie deep in the technical appendices. Both the EIR text and appendices need a closer comparison of existing and future conditions at each key congestion or trouble spot. In Appendix 9 for example, Table 5 showed existing conditions based on on-off loading from the platforms, while Tables 13 and 14 reflect conditions inside the cars at the highest load point. There needs to be a Table 5A that gives current estimates of peak load conditions on the train. 34.6

Inconsistencies in Amtrak and Commuter Rail forecasts

The data presented on page 2-6 suggests that there would be an increase in Amtrak daily train movements from 72 to 138, or an increase of 92 % over the next 20 years. However, the increase in Amtrak ridership would be only 37 %. Are these numbers correct and do they reflect a proper planning for efficient passenger handling? 34.7

Meanwhile, the daily MBTA commuter trains would increase from 377 moves to 416, an increase of 13%. The percentage increase in commuter rail riders is almost the same as Amtrak -- 33%. The basic results warrant further detailed explanation. 34.8

Specifics on Red and Silver Line Capacities

In Appendix 9 of the DEIR on page 26 and 27, the volume to capacity ratios are shown for various rail lines. I urge that careful thought should be given to revising all of the numbers. The Red Line peak load point shows a V/C ratio of 0.59 for northbound service approaching South Station in the morning peak hour. Southbound service would peak out at a V/C ratio of 0.33, which implies that the trains are only one-third full in the peak hour. 34.9

These results reflect future no-build conditions where added riders are included, but there are no physical changes. In other words, the existing conditions are that the V/C ratios are less than 0.59 and 0.32, but there is no data in the DEIR to tell us how much. Both numbers are implausible under any circumstance, because the Red Line is running today a rather frustrating mixture of half-empty trains and cars that are jammed to the gills. Headways on the Red Line in the peak hour vary from two minutes to seventeen minutes, and all sense that trains should be running "on-time" has been completely lost.

The problems on page 27 extend to the Orange Line, with jammed conditions at Sullivan Square in the morning, yet MassDOT shows the trains as half full (or half empty) with a V/C of 0.48. The inbound Green Line in the morning is shown with a V/C ratio of 0.50 – again half empty or half full. How can these figures so lacking in credibility be explained?

The opposite conditions occurs for the Silver Line, where Routes 4 and 5 are shown with V/C ratios of 1.81. This means that the ridership volume is almost twice as much as available capacity. Again, these results are lacking in credibility.

For commuter rail, in the 2035 No Build AM peak, six lines would have V/C ratios of less than 0.40, and only three would be more. What justification could there be to seeking longer or higher capacity trains?

Regrettably, there have been few submissions to MEPA in past years that considered the capacity abilities of mass transit, especially the subways. The only one I could find was for the 2002 DEIR for North Point (EEA #12650, Table 3.4.8, page 3-31, Transportation). For this assessment, then existing V/C ratios for the Red Line were in the range of 0.50 to 0.53. Again, a Red Line that is half-empty/half-full.

My ultimate concern is that if all of the proposed changes at South Station work well and all expectations are met, the limiting factor will be the Red Line and its inadequate practical capacity. The SSX program could still be conceived as a positive step towards meeting existing needs, and also providing a boost to transit capabilities to deal with future conditions such as a possible 2024 Olympics in Boston.

Regrettably, I have seen no one in the public or private sector (except for one private developer) who has perceived either the need or the ability to achieve efficiency and capacity improvements to the Red Line, either with existing equipment, or with new equipment replacing the old, or with additional trains and operators willing to do what the City of Chicago already does – which is operate subway trains on 90-second headways (three times as frequently as trains are now scheduled on the Red Line).

Even more remarkable is that back in 1926 the Boston Elevated Company operated trains on what we today call the Red Line, and did so with 90 second headways.

Sincerely,

Stephen H. Kaiser, PhD

Kenneth J. Krause
50 Mystic Street Medford, MA 02155
781-396-0920 kenneth.krause@comcast.net

December 24, 2014

Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
MEPA Office, Attn.: Holly Johnson, EEA # 15028
100 Cambridge St., Suite 900
Boston, MA 02114

Dear Ms. Bartlett,

Thank you for the opportunity to comment on the Draft Environmental Impact Form (DEIR) for the South Station Expansion project, EEA #15028, dated October 31, 2014.

Many aspects of the project outlined in the DEIR are commendable, particularly from an environmental standpoint. These include providing more public transit service to decrease the population's reliance on automobiles; better intermodal connectivity, vehicular circulation, and reduced congestion; improving the conditions and connectivity for bicycling and walking near the station, including construction of a cycle track on Dorchester Avenue and an extension of the Harborwalk; restoring Dorchester Avenue in its entirety for public and station access; and improving ADA access; and using sustainable design measures.

However, as welcome as these improvements are, the expansion of the station by a modest seven tracks and two platforms will do little to alleviate the current capacity problems at the station, nor will it address accommodating the extensive proposed future rail service expansion by Amtrak and the MBTA. By itself, it is a project that will leave Boston with a transit hub that is still maxed out almost from the day it re-opens.

This expansion plan would be worth considering were South Station the only rail station in Boston and were there no options for extending the incoming lines from the south. However, there is a better solution to the capacity and congestion problems at South Station that should be wholly integrated into the South Station Expansion plan: the North-South Rail Link (NSRL).

The existence of the NSRL would eliminate many of the problems the multi-billion dollar South Station Expansion project endeavors to try to solve, but clearly will not. If commuter rail and Amtrak trains could pass through South Station to North Station and continue in service north of Boston, the capacity and bottlenecking problems that exist at South Station today would be greatly reduced. There would be no need to keep trains in the station any longer than necessary (or stored on a layover yard elsewhere), freeing the tracks for incoming trains and passengers.

The South Station expansion makes sense only as part of a project that includes the North-South Rail Link. However, there is virtually no mention of the North-South Rail Link in the more than

1,000 pages of the DEIR, despite that fact that your predecessor secretary's certificate on the SSX Expanded Enviromental Notification Form stated that the DEIR "should describe how the proposed South Station Expansion Project will be designed to not preclude future construction of the North/South Rail Link project." The only such reference is in regard to an explanation of why ground source heat pumps are not recommended for the project. No information is offered about how the design is being planned with the future North-South Rail Link in mind, nor is any specific detail presented with regard to the location of major infrastructure, including pilings for associated commercial development above the station, and their potential impact on the NSRL. Essentially, there is no evidence in the DEIR of any consideration of the North-South Rail Link, which fall short of satisfying the secretary's certificate.

The Final Environmental Impact Report should be required to provide the specific details in all relevant areas of the project that will ensure that the SSX is being planned with the future North-South Rail Link in mind. This is essential, because once this expansion project is built, there will be no more room for expansion. Future capacity and congestion issues that will assuredly arise will finally force the hand of state transportation officials: it will be obvious – just like it has been to many for years– that there is no better (or other) solution to the South Station capacity problems than to build the North-South Rail Link. 35.1

When that day comes, it will be tragically unfortunate – and monumentally expensive – if the South Station Expansion was not completed without the North-South Rail Link given the highest consideration, as is the case in the DEIR.

Please instruct MassDOT to provide the proper planning and documentation of considerations of the future North-South Rail Link in its Final Environmental Impact Report on the South Station Expansion Project.

Thank you for your consideration.

Ken Krause

Ken Krause
50 Mystic Street
Medford, MA 02155
781-396-0920

Johnson, Holly (EEA)

From: Bob La Trémouille [boblat@yahoo.com]
Sent: Tuesday, December 02, 2014 12:28 PM
To: Johnson, Holly (EEA)
Subject: South Station Expansion Project, EEA No. 15028
Attachments: 12-02-14, DEIR Comments.pdf

TO: holly.s.johnson@state.ma.us

RE: South Station Project, EEA No. 15028
Draft Environmental Impact Report
Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
MEPA Office, Attn: Holly Johnson, EEA #15028
100 Cambridge Street, Suite 900
Boston, MA 02114
holly.s.johnson@state.ma.us

RE: South Station Expansion Project, EEA No. 15028
Draft Environmental Impact Report

Madam Secretary / Ms. Johnson:

Enclosed for your processing are my comments on the South Station Expansion Project Draft Environment report.

These comments have considerable overlap with my comments on EEA #15278, the I90 Allston Interchange Project, except that they involve further thinking on the matter.

I anticipate I will supplement EEA #15278 to bring those comments up to date.

Thank you kindly for your consideration and processing.

Robert J. La Trémouille
Post Office Box 391412
Cambridge, MA 02139-3070
617-283-7649

Robert J. La Trémouille

Post Office Box 391412
Cambridge, Massachusetts 02139

Cell: 617-283-7649
E-Mail: boblat@yahoo.com

December 2, 2014

Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
MEPA Office, Attn: Holly Johnson, EEA #15028
100 Cambridge Street, Suite 900
Boston, MA 02114
holly.s.johnson@state.ma.us

RE: South Station Expanion Project, EEA No. 15028
Draft Environmental Impact Report

1. Synopsis.
2. Introduction.
3. Limits of the DEIR Analysis.
a. Introductory.
b. Beacon Yards Layover.
c. Project facing Dorchester Avenue.
d. Expansion to include a lower level or levels of track space for future expansion.
4. It is segmentation if the analysis does not include passenger traffic in East Cambridge. Highway Conflict.
5. It is segmentation if the analysis does not include passenger traffic in East Cambridge. Increase of existing heartless animal abuse.
6. Summary.

Madame Secretary:

1. Synopsis.

The plans for South Station Expansion are deficient because they do not allow any room for any expansion beyond South Coast rail. There seems to be exactly zero room after that. Alternatives are proposed by me which should be considered.

Similar problems exist at the Beacon Yard layover proposal. My suggestion for improvement should be considered in the analysis..

With the current plans, new commuter train service which should go to South Station will have NO CHOICE but to go over the Grand Junction with major environmental destruction in Cambridge, starting with commuter rail traffic generated by West Station.

Failure to include analysis this totally new passenger route which is forced by the inadequate planning at South Station constitutes segmentation, both for interference with traffic on major Cambridge arteries and for environmental harm and increase of existing heartless animal abuse on the banks of the Charles River. Cambridge and the Department of Conservation are already practicing heartless animal abuse on the banks of the Charles River targeted at long term, valuable and popular resident animals.

Analysis should include the DCR's policy in its "Charles River Master Plan" of killing off or driving away all resident animals on the Charles River Basin.

2. Introduction.

I am writing individually and as chair of Friends of the White Geese, a Massachusetts Non Profit Organization organized in 2001 with the purpose of protecting the environment and animals of the Charles River and related matters.

I myself have two years of on the ground experience in railroad operations. I have, as part of my railroad position, observed freight and passenger railroad operations first hand from Boston almost to Washington, DC. I have major experience in working on transit planning matters in the Boston / Cambridge area over a period of nearly 40 years.

I proposed the Kenmore Crossing on the Urban Ring subway concept five years before it was officially adopted by the MBTA as a recognized alternative route in 1991.

I have major environmental experience. In the last 15 years, this has been on Charles River and related matters. I rather clearly have prevented a mass animal killing in that location.

In the last 40 years I have used my legal training for the benefit of the environment in Cambridge.

I obtained a preliminary injunction on appeal, next to impossible, in a temporarily successful effort to protect from needless destruction one of the best parks in the middle of Cambridge, including more than 20 one hundred year old trees.

I have written more successful zoning changes in Cambridge than any other person not employed by the City of Cambridge, and, in sharp contrast to many changes drafted by the Cambridge Development Department my changes do what I said they would do.

I have used zoning as a tool to force environmental protection on very major parts of the City of Cambridge. My zoning changes have required ground floor open space and more housing on about 85% of Massachusetts Avenue in the area between Harvard and Central Squares and portions of adjacent side streets. My zoning changes allowed fairly large buildings on Mass. Ave. while maintaining environmental protections and protections for neighbors.

The building at the corner of Massachusetts Avenue and Harvard Street in east Harvard Square, formerly known as the Inn at Harvard was one of my big victories. Harvard wanted that building to be 72% larger and built to the sidewalk. The City Council disagreed.

About a block away, I saved the 19th Century building at 10 Mt. Auburn Street, on the corner of Banks and Mt. Auburn Streets from destruction by Harvard. I used fine print in the Cambridge Rent Control Ordinance, and the Cambridge Rent Control Board agreed with me. Saving that building probably was key in the retention of the historical character in this, the Kerry Corner neighborhood with Harvard's expansion in this area since 2000.

The first two blocks north of Harvard Law School were downzoned as a result of the very first petition written by me.

There is a former parking lot between Alewife Station and Route 2 which is being returned to nature as a result of another zoning change I wrote. This is the only meaningful environmental victory in the Alewife area in spite of a Cambridge related group which claims to be protecting Alewife.

And this does not include the non explosive changes.

3. Limits of the DEIR Analysis.

a. Introductory.

I was fully in favor of the South Station Expansion Project until it sunk in that there is no thought whatsoever as to what flexibility exists for future expansion.

In fact, my understanding is that there is no thought of any capability of future expansion of South Station or its holding facilities whatsoever after this project.

It looks to me like the proposal traps our Commonwealth in the same sort of shortsighted thinking which brought railroad transportation into the fifty to sixty year mess which we are now attempting to undo. But after this go round, there may not be an opportunity to undo this mess.

b. Beacon Yards Layover.

My analysis at South Station is another approach to my analysis in EEA #15278, the I90 Allston Interchange Project. The most serious problem in both plans is failure to allow for future expansion.

We do not have the luxury of being unconcerned about future expansion. We have the possibility now to leave room to allow our railroad system to thrive. If we do not take needed action now, we are boxing ourselves into a death of strangulation.

Correction of the artificially created limits on the layovers at Beacon Park can NOW be readily corrected by building layover tracks on both sides of the relocated Mass. Pike, not just on the side away from Cambridge Street, as is proposed in the I90 Allston Interchange Plan and blessed in the South Station Expansion Plan.

This shortsightedness can easily be corrected by inserting a switch in the access track from South Station to the proposed layover yard as that track approaches the proposed layover yard. The track approaches the layover yard under the reconstructed Mass. Pike Viaduct before the Mass. Pike returns to ground level. A switch can readily be inserted before the Mass. Pike returns to ground level so that the switch would give the option that layover trains can go on either side of the relocated ground level Mass. Pike. There is no plan for any public transportation use between the relocated Mass. Pike and Cambridge Street. There is plenty of room to set aside adequate area to allow for future transportation needs.

Please note that my analysis of the I90 Mass. Pike Allston project also proposes a layover yard between this added commuter rail layover area and Cambridge Street. This layover yard would be for a street car Green Line A spur from the existing Green Line B to Harvard Square as described in greater detail in my I90 analysis.

c. Project facing Dorchester Avenue.

The same problem of total lack of future expansion applies to the main project.

I repeatedly hear reasons why greater expansion cannot be done, but it is clear that the limits being artificially imposed on the expansion project are the greatest problem for future South Station expansion.

Part of the unthinking limits problem, as it was 50 or 60 years ago, is the application of non railroad priorities ahead of railroad priorities in spite of the very great reality that the places where railroad expansion can be placed is under very severe limits, whereas the alternate uses do not have that very real limit.

This defective thinking applies strongly to that portion of the project facing Dorchester Avenue.

Certainly Boston needs housing, and certainly it is a lovely location for housing, BUT there are other locations for housing. There are pretty much no other locations to expand South Station capacity.

Addition of one or more tracks in the area facing Dorchester Avenue should be seriously considered. Perhaps the housing could be placed above the added tracks. A higher location for housing certainly would be inferior for housing, but this is a matter of life or death for future South Station expansion. 36.1

I am told there is a choke point problem in the entrance to South Station with regard to adding tracks next to Dorchester Avenue. I not aware of any meaningful analysis of the choke point. Have I missed something? At minimum, such an analysis should be presented. 36.2

d. Expansion to include a lower level or levels of track space for future expansion.

A lower level or levels of track space is being proposed by the North-South rail people. Their idea could be a solution to the limits being imposed on South Station Expansion, with or without North-South rail.

Definitely, building 7 tracks at the same level as the current facility, plus building room under the 7 tracks for an additional expansion in the future sounds like an excellent way to get around the crunch point problem, if the crunch point at the entrance to the current South Station facility is a true and absolute limit on expansion at the current level.

Of course, the construction for access to the lower level IN THE FUTURE would be a lot more expensive than the current access cost for new tracks into the 7 proposed tracks.

But we are talking about a station which currently has 13 tracks being expanded to 20 tracks with no future expansion, as opposed to expanding to 20 or 22 tracks now with the possibility of 27 to 31 tracks in the future.

Creating a lower level could include expansion under Dorchester Avenue for the lower level. 2 tracks under Dorchester Avenue could combine with such larger lower and main levels as can be constructed at this time.

With the mail facility moved and Dorchester Avenue not yet reconnected to South Boston / Dorchester, construction under Dorchester Avenue would be readily feasible. Could that bring a possible lower level to 11 tracks with 9 tracks on the current level?

Can the expansion project build under tracks 11, 12 and 13 and others for future expansion? Why not include that in the analysis as well? Perhaps doing it in phases. Build toward Dorchester Avenue first, and let those new tracks temporarily replace 11, 12, and 13. Could a lower level be created under all the existing tracks, working in stages? There is no such analysis in the submittal. 36.3

An excellent example in the South Station complex of such planning for the future is the parking garage on top of the bus facility. That is obviously intended as a location of future expansion of bus service.

Why not use underground expansion in the future for parking in the short run as in the bus facility? 36.4

Why restrict underground expansion possibilities to one level, with parking until need and money exists? Can more underground levels be constructed with corresponding future track expansion, and interim use for parking..

This is not being studied and it should be.

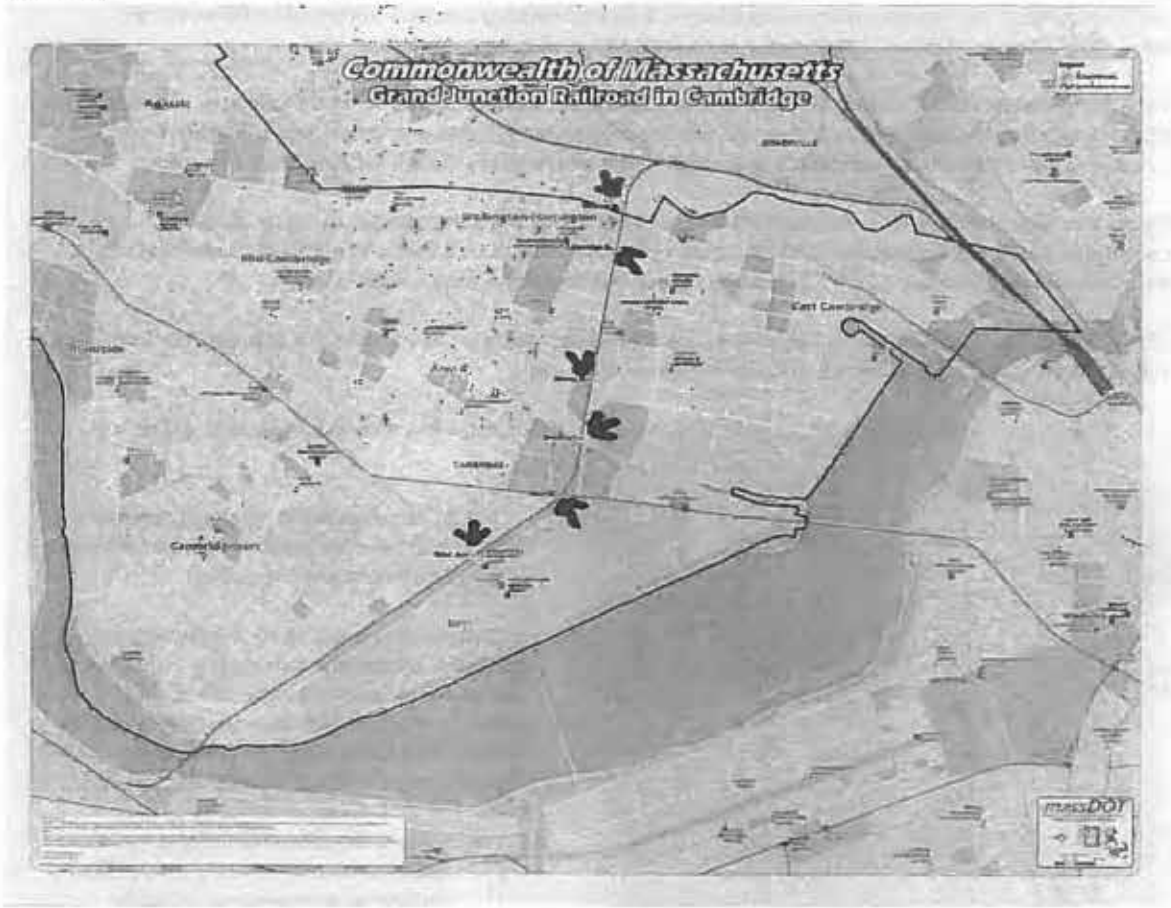
Is it necessary or even sensible to create an artificial limit on future expansion of South Station?

4. It is segmentation if the analysis does not include passenger traffic in East Cambridge. Highway Conflict.

Below is MassDOT's map of the Grand Junction railroad in Cambridge taken from an MIT submittal. I have added thick markings of intersection conflict with existing road traffic.

As stated in my 190 Allston analysis, where will West Station trains go? Why guarantee an environmental nightmare in the eastern part of Cambridge for trains which sensibly should go to South Station?

And the reality is that, given the obvious forcing of use of East Cambridge for future expansion, it looks like failure to include impact of future expansion on East Cambridge would not only be segmentation, but would be dishonest.



There was great hostility to expanding commuter rail to East Cambridge the last time it was proposed. MassDOT's analysis indicated that Grand Junction commuter rail use would have no value except for Kendall Square. There has been no communication of what looks like a certain proposal to put West Station commuter trains on the Grand Junction. Such lack of communication is dishonest.

Especially since creating underground facilities at South Station are obvious alternatives now, and there is no mention that the South Station expansion project as proposed will prevent future expansion and mandate use of the Grand Junction for West Station and other future expansion.

5. It is segmentation if the analysis does not include passenger traffic in East Cambridge. Increase of existing heartless animal abuse.

In addition to the highway conflicts, there would be very real environmental conflicts and the ramping up of existing deliberate heartless animal abuse on the Charles River:

The portion of the banks of the Charles River abutting the Grand Junction on both sides of the Grand Junction is animal habitat. It includes animals of long term residence on the Charles River. In spite of a decade of outrageous misbehavior by Cambridge, the DCR and their friends, many resident animals continue to exist.

Of particular importance is the valuable popular gaggle of the Charles River White Geese who have resided on the Charles River for 34 years and have established a strong community readily admired by all familiar with them. The vibrancy of this free community is an ideal subject for scholastic study.

Their biggest problem of the Charles River White Geese is vile treatment and abuse by Cambridge and the DCR. The Charles River White Geese are, once again without mentioning it, being heartlessly and deliberately starved by Cambridge and the DCR taking their long term food at the Magazine Beach playing fields from them.

Cambridge's map of the area is attached. This is yet another environmental attack on the animal habitat. Cambridge is considering building in the Destroyed Nesting Area of the Charles River White Geese and placing a fence following the railroad tracks blocking access between the two animal habitat areas.

The area which is animal habitat is bounded by the BU Boathouse on the north and the BU Bridge on the south, and by the hashed line to the left and the Charles River to the right.

This outrage has been achieved through flat out lying.

a. The DCR manager has repeatedly promised "no harm" to the Charles River White Geese while deliberately starving them.

b. Their food at the Magazine Beach playing fields has been taken from them with bizarre introduced bushes walling off the Magazine Beach playing fields from the Charles River. This outrage has been achieved through multiple lies and lies of omission.:

(1) Never mentioned is the goal in the sanctified Charles River Master Plan to kill of or drive away all resident animals on the Charles River Basin. This vile goal in itself should be addressed in any environmental analysis.

(2) The key DCR manager has spent ten years or more lying of no intent to harm them. This flat out lie was included in the Boston Globe article

on the start of deliberate starvation by a quotation next to a photo of a massive earth mover next to a tiny confused resident.

(3) The promise at the Magazine beach playing fields was a lawn to the river. So the DCR and Cambridge simply ignored the promise, and rewrote the supposedly sacrosanct Master Plan to comport to their lies of omission.

(4) The DCR has contempt for bordering vegetation. They, twice a year, destroyed all bordering vegetation on the Charles River basin, and claim incompetence for the bizarre wall.

(5) As many other projects as is conceivable includes heartless attacks on the residential animals supposedly incidental to the other projects.

(6) The DCR repeatedly and loudly has proclaimed an intent to restrict the banks of the Charles River to river related activities. The starvation wall makes the Magazine Beach playing fields totally separated from the Charles River. They might as well be five miles inland.

(7) Multiple other projects are in the works attacking resident animals while keeping the attacks secret.

(8) Fake groups associated with the City of Cambridge function as company unions to achieve Cambridge and the DCR's destruction by keeping concerned folk busy chasing their tails. And, in reality, too many supposedly transportation groups / protective groups are similarly influenced.

(9) Cambridge commonly lies about supposed sainthood through loud initiatives which have no relation or minimal relation to their community which, in reality, serve no purpose other than to convince the voters that heartless animal abusers are the opposite. Excellent examples of this hypocrisy is

(a) The repeated yelling at Circus owners for their abuse of animals while

(b) Keeping Cambridge deliberate starving of the Charles River White Geese and other heartless abuse (Alewife in particular) as secret as they can get away with, and

(c) Flat out lies that a government which is heavily involved in Charles River destruction and international relations has no business concerning itself with Charles River destruction.

The situation on the Charles River is an outrage. Sneaking through more destruction through secret aspects to the South Station Expansion and the I90 Allston Interchange project fits a reprehensible pattern.

MassDOT has rejected more obvious attacks on the Charles River by rejecting proposals for highway construction over the Grand Junction bridge.

MassDOT is a responsible agency. The same cannot be said for Cambridge, the DCR and their friends. These dishonest entities should not be rewarded with destruction unavoidable after their maneuvering, but very real if you realize what is really involved in the South Station Expansion and I90 Allston Interchange project.

6. Summary.

The proposal is generally excellent.

It strikes me as silly to artificially restrict future South Station expansion when we have seen the railroads destroyed 50 to 60 years ago as a result of devaluing these excellent source of transportation.

Review should be made of allowing for further expansion using South Station after the South Coast project is in operation.

Why prevent further expansion of South Station after the currently planned expansion of trains into South Station?

And why allow unavoidable "side effects" to be rammed through in secret?

Thank you for your kind consideration.

In particular, I am strongly impressed with the professionalism of both MassDOT teams, here and in the I90 Allston Interchange project. I have seen praiseworthy examples of MassDOT standing up to environmental outrages stemming from the City of Cambridge and the DCR, especially through unidentified but very truly influenced "private" individuals.

My favorable impression of MassDOT is strikingly different from my impression of Cambridge and the DCR.

Sincerely,

Robert J. La Trémouille

Johnson, Holly (EEA)

From: Katherine Meyer [meyergroupkgm@yahoo.com]
Sent: Monday, November 24, 2014 11:44 AM
To: Johnson, Holly (EEA)
Subject: South Station enlargement DEIR, EEA#15028

To: MEPA
Re: South Station enlargement DEIR, EEA#15028
Date: November 24, 2014

To Whom It May Concern:

The South Station enlargement is the right direction for MA transportation planning to go. I support it, if:

1. The North South link possibility is not cut off by this work. 37.1

2. The rail connection to the Port is kept and improved. 37.2

The subsequent development plan for buildings needs to include residences. The number of residents and office workers must be carefully calculated. Overcrowding is to be avoided. Also, the rent for retail, etc. should be estimated conservatively. The figures for rent and vacancies for Union Station (D) should be studied. 37.3

Sincerely yours,
Katherine Green Meyer
326 A Street, 4B
Boston, Massachusetts 02210-1722

Johnson, Holly (EEA)

From: Gerry Pieri [gerrypieri@verizon.net]
Sent: Wednesday, December 24, 2014 8:57 PM
To: Johnson, Holly (EEA)
Subject: Issues with South Station Proposal

Hi, Holly,

I am Gerry Pieri, the former Assistant Secretary of Transportation and Director of Rail Operations for MassDot.

I Have a number of objections to the draft EIS for South Station. The most important of which is the lack of provisions for a surface Red Line terminal at South Station.

A fatal flaw:

The proposed station design completely stops a decades-old plan which would quadruple (perhaps more) the capacity of MBTA's Red Line.

The proposed design is an absolute failure to provide for the long-planned need to provide surface transportation of the Red Line into South Station.

Thus, the opportunity to increase the Red Line's capacity at least four-fold will be lost forever.

This cannot happen.

We must allow space for a 4-track Red Line station (with two platforms) on the second level above tracks 15 through 18 along including space for a robust interlocking. (Two tracks will not work.)

This goes back to the 1969 MBTA Master Plan which indicated that a surface route from Columbia Junction was a necessity adjunct to the expansion to the South Shore (then Quincy, now Braintree).

Indeed, the current configuration of Columbia Junction provides for trains from either Ashmont, or Braintree to switch to either the Subway or the surface tracks to South Station without any cross-over moves.

And, the two-track right of way from Columbia Junction to the Red Line yards just south of South Station is designed and constructed to enable efficient surface service to South Station.

With the surface extension of the Red Line, (and with a coordination of dispatching times) the capacity of the Red Line increases at least four-fold (perhaps more with a choice of rolling stock); run times (especially to Alewife) are decreased; and the riders experience a substantially more consistent interval between trains.

All of this is lost if we do not reserve the space for a future Red Line terminal on the second level of the station.

The potential benefits are great, and the cost is trivial.

This email has been checked for viruses by Avast antivirus software.
www.avast.com

Response

of

Gerry Pieri

(Former Massachusetts Assistant Secretary of Transportation)

and

(Former Massachusetts Director of Rail Operations)

to the

Draft Environmental Report

South Station Expansion Project

EEA No 15028

Topics

A fatal flaw: Failure to provide for the long-planned need to provide surface transportation of the Red Line into South Station

The absolute need for Widett Circle as the principal layover facility

Widett Circle can handle all of the MBTA's commuter rail storage needs in Boston

Significant opportunities for the air rights development of Widett Circle

Track configuration issues at South Station

Opportunity to resolve trackside environmental issues at the existing bus terminal

Opportunity to improve distribution of South Station riders to their eventual destinations.

A fatal flaw:

The proposed station design completely stops a decades-old plan which would triple (perhaps quadruple) the capacity of MBTA's Red Line.

The proposed design is an absolute failure to provide for the long-planned need to provide surface transportation of the Red Line into South Station.

Thus the opportunity to increase the Red Line's capacity at least four-fold will be lost forever.

This cannot happen.

We must allow space for a 4-track Red Line station (with two platforms) on the second level above tracks 15 through 18 along including space for a robust interlocking. (Two tracks will not work.) 38.1

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All of this is lost if we do not reserve the space for a future Red Line terminal on the second level of the station.

The potential benefits are great, and the cost is trivial.

The absolute need for Widett Circle as the principal layover facility

Widett Circle is the only remaining viable opportunity for mid-day (and overnight) storage of MBTA train-sets.

All other viable opportunities have been lost due to previous development decisions (most of which represent a far better land use than a rail storage facility):

- Storage in South Boston at the area formerly known as the “Commonwealth Flats” is no longer possible due to the development of the Convention Center and related development including the “Innovation District”,

- The traditional storage location at (and near the Fan Pier) is no longer possible due to the development of the Federal Courthouse and surrounding facilities,

- Previous storage tracks (just south of South Station) were lost four decades ago when the MBTA Red Line “Cabot” storage and maintenance facility was created thereby enabling substantial land-use improvements between Harvard Square and the nearby Charles River.

The current land use at Widett Circle is no longer efficient or environmentally appropriate in today’s transportation environment:

- Historically, the Widett Circle land was used by the New Haven Railroad as a place to transload rail dependent commodities to local trucks for distribution. This made a lot of sense when the commodities were shipped by box car on The New Haven (from the Pennsylvania Railroad via the New York City car floats or from a host of other railroads via the Poughkeepsie Bridge and the “Maybrook Gateway”.

- Today, the car floats are all-but-gone, the Poughkeepsie Bridge is closed to rail traffic, and no freight moves into the Boston area via the traditional New Haven route (the “Northeast Corridor”).

- The creation of PennCentral, and, later, the creation of Conrail diverted the rail traffic. Also, the transition of goods shipment patterns from box car to intermodal have essentially eliminated the rail-dependent traffic to the current occupants of Widett Circle.

- What little, if any, rail freight moves into Widett Circle can (and should) easily be accommodated elsewhere. Several potential locations exist.

Widett Circle is an ideal location:

- It is less than one mile from South Station.
- Movements to and from South Station can be made without interfering with revenue train operations.
- The location is very convenient for crew purposes.

On the contrary, the current storage of train-sets at Readville completely violates environmental and operational goals: 38.2

- It involves nearly a 9-mile move (twice a day) for each stored train-set – using energy, creating emissions, and creating operational conflicts with revenue trains.
- The Readville facility traditionally has been a source of displeasure to – and opposition from -- its neighbors (in what is essentially a residential neighborhood).
- The location provides almost no options for crew members who are expected to lay-over at the site.

Likewise, the Beacon Park layover site creates environmental and operational issues:

- The site involves a 6-mile from South Station move (twice a day) for each stored train-set – using energy, creating emissions, and creating operational conflicts with revenue trains.
- The track between South Station and Beacon Park is already congested with revenue traffic including the time-consuming low platform station at Back Bay.
- There is a substantial future demand for additional revenue traffic on the track involved which is already congested to the point where scheduling of needed additional peak-hour Framingham and Worcester trains is nearly impossible.
- The location provides limited options for crew members who are expected to lay-over at the site.

Widett Circle is the ideal layover site. No other site is viable.

Widett Circle can handle all of the MBTA's commuter rail storage needs in Boston

The DEIR correctly states that currently, there is a perceived need for 49 layover tracks for South-Side commuter rail trains.

The DEIR also correctly states that Widett Circle may only be able to provide 28 tracks.

However, the apparent discrepancy of 21 tracks is really not an issue:

- Already, there are at least 15 other tracks available to the MBTA in the Southampton area.

- There are substantial opportunities to schedule trains such that most trains (and their crews) return to their point of origination, rather than lay-over in Boston thereby:

    - Reducing the number of trains that lay-over in Boston,

    - Improving the opportunities for "reverse commuting",

    - Allowing crews to begin and end their day at the same location thereby eliminating costly split shifts and / or costly deadhead crew moves.

Widett Circle can be the answer for all of MBTA's current and future lay-over needs.

Significant opportunities for the air rights development of Widett Circle

The air rights development opportunities at this key site are substantial. 38.3

It is critical that the layout of the site provides room for adequate support columns to enable air rights development – even if this means that one or two of the 28 tracks are sacrificed.

Widett Circle presents an unequalled opportunity for constructing a major stadium – capable of being the home site of the New England Revolution soccer team as well as being the crucial factor in Boston's future desires to host the Olympics.

Substantial opportunities exist to provide direct access to the site from the Red Line, from Commuter Rail, and by foot from South Boston.

It is possible to create the ideal center-city sports facility.

It appears that the current ownership of the New England Revolution is favorable to this opportunity. However, only future negotiations (far beyond the scope of the South Station project) can confirm this interest.

If such an interest exists, conditions of the air-rights agreement must include a connection to a surface Red Line station and to a special use Commuter rail station similar to the Providence Airport "InterLink". Ideally, this "InterLink" would extend above the MBTA property to provide pedestrian access from South Boston.

Track configuration issues at South Station

The real track configuration issues at South Station go beyond those identified by the DEIR.

The real capacity issue ("the scarce commodity") is the "double slip switches".

Double slip switches are the track structures that allow both a cross-over move and a turn. In other words, the single structure acts both as a cross-over and as a pair of switches.

The author conducted detailed analysis of all of the movements (scheduled and "pull-back" at South Station as part of the Central Artery / Tunnel ("Big Dig") project. The inescapable conclusion was that station track assignments which minimized cross-over moves could resolve all track-occupancy conflicts during the "Big Dig" – to the extent that a two-track (rather than three-track) temporary bridge crossing over the Fort Point Channel was workable – thereby saving tens of millions of dollars in project costs. 38.4

The current DEIR should be revisited to possibly revise the proposed interlocking design.

Opportunity to improve distribution of South Station riders to their eventual destinations.

The author strongly endorses the concept of an additional head house providing direct access from Dorchester Avenue. 38.5

This design will substantially increase pedestrian access between South Station and nearby destinations in South Boston just across the Fort Point Channel.

More importantly, this design preserves the opportunity for a water taxi / MBTA water shuttle service to all of the center city waterfront and to the South Boston waterfront.

The harbor is an unused opportunity to move people around the most congested portions of the city.

Gerry Pieri

24 December 2014

781-834-4285

46 Bay Street, Box 394
Green Harbor, Massachusetts, 02041-0394

Johnson, Holly (EEA)

From: James RePass [jprepass@gmail.com]
Sent: Friday, December 19, 2014 2:23 PM
To: Johnson, Holly (EEA)
Cc: Michael Dukakis; Jay Ash
Subject: Comments re SSEP (South Station Expansion Project) EEA No. 15028

December 18, 2014
Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs
MEPA Office, Attn.: Holly Johnson, EEA # 15028
100 Cambridge St., Suite 900
Boston, MA 02114
Fax: 617-626-1181
Email: Holly.S.Johnson@state.ma.us

Dear Secretary Bartlett:

I am writing to comment upon the DEIR recently released regarding the South Station Expansion Project – EEA No. 15028.

I appreciate the opportunity to comment, and the fact that a great deal of work has gone into this document.

It is therefore with regret that I must inform you that the DEIR as produced falls woefully short of addressing the expansion issues it was supposed to consider, or considering other viable possible solutions that are available to the Commonwealth.

Instead, and despite repeated input from former Governors, current political leaders, transportation advocates, and rail experts with national reputations that connecting North and South Station via a Rail Link would be the actual solution to capacity issues at both stations, this DEIR focuses on a narrowly conceived track-expansion project that comes nowhere close to being a comprehensive solution, and will in fact make things worse.

Building or expanding dead-end rail stations in major cities, when they can be connected, is foolish. No European country would dream of engaging in a project as ill-conceived as this one, in a city where the two major terminals are literally a mile apart, and where connecting them would provide not only the capacity both 39.1

North and South stations need, but create a new through-service up and down the Eastern Seaboard of New England for both intercity and commuter rail trains, effectively quadrupling the size of the employee/employer pool.

My organization is bi-partisan and has over 25 years of experience in matters such as this, and in getting projects built: we are the group that in 1991 successfully reversed a decade of Reagan-Bush administration opposition to the electrification of Amtrak's Northeast Corridor between New Haven and Boston, and thereby cut NYC-Boston travel times almost in half.

I wish to be as clear as possible that if this DEIR is not rejected, and then modified to include the Rail Link option, then we will oppose it in the courts, in the State House, and in Washington, where there is little appetite for transportation infrastructure projects, even good ones. This short-sighted SSEP project, as presently conceived will be dead on arrival.

James P. RePass Sr.

Boston MA

Founder and Chairman, the National Corridors Initiative

jprepass@gmail.com

617-269-5478

Johnson, Holly (EEA)

From: Joe Rogers [jrogers17@me.com]
Sent: Wednesday, December 24, 2014 5:25 PM
To: Johnson, Holly (EEA)
Subject: Comments RE: SSX_DEIR__EEA #15028

Joseph Rogers
21 Wormwood Street, Unit 216
Boston, Massachusetts 02210

December 24, 2014

Secretary Maeve Vallely Bartlett
Executive Office of Energy and Environmental Affairs MEPA Office, Attn.: Holly Johnson, EEA # 15028
100 Cambridge St., Suite 900
Boston, MA 02114

Dear Secretary Bartlett,

I am writing to express my interest and support for the South Station Expansion project, especially as it relates to the opening of Dorchester Avenue, and the future build out of the Harborwalk and public areas of the current United States Postal Service General Mail Facility property.

However, as a civic/ community leader with the Fort Point Neighborhood Association, I am very concerned with the future of the development along the A Street Corridor, specifically parcels between Congress and West Second Streets. I understand part of the South Station Expansion plan includes a land exchange between the United States Postal Service and the Massachusetts Department of Transportation. It is imperative that the A Street parcels are developed within the stated objectives and guidelines of the City of Boston One Hundred Acre Plan. 40.1

I look forward to future community meetings to address the South Station Expansion project.

Respectfully submitted,

Joseph Rogers
617-388-6813

Sending this to you via my email account shall constitute my signature.

Johnson, Holly (EEA)

From: Frederick Salvucci [salvucci@exchange.mit.edu]
Sent: Wednesday, December 24, 2014 4:40 PM
To: Johnson, Holly (EEA)
Subject: Fwd: Comment letter on draft EIR on South Station expansion Project. MEPA # 15028

Sent from my iPad

Begin forwarded message:

From: Frederick Salvucci <salvucci@exchange.mit.edu>
Date: December 24, 2014 at 4:39:07 PM EST
To: Frederick Salvucci <salvucci@exchange.mit.edu>
Subject: Comment letter on draft EIR on South Station expansion Project. MEPA # 15028

Dear Sectretary Bartlett,
I am writing to support the expansion of South. station as an intermodal transportation center, but to also urge that greater specificity be required on a number of essential points, especially regarding : 41.1
1) the intended end state upon project completion
2) the compatibility of the intended end state with a number of other Massdoot priorities which are either not mentioned, or asserted to be compatible, but without adequate detail to demonstrate compatibility. These include the proposal for a new DMU service to better serve the Fairmont Branch; 41.2 the proposal for DMU service from Back Bay to the convention center; 41.3 The requirement in past EIR approvals for the expansion of the Bus Terminal, and inclusion of a Massport South Station to Logan direct shuttle, which will almost certainly be required to relieve the overloaded Silver Line as growth in the Seaport Innovation district in combination with growth in trips to Logan , are already exceeding the capacity of the Silver Line; 41.4 the pedestrian access to the expanded Bus terminal, and the integration of the pedestrian flows of the rail and bus patrons through the common commercial service area, and connections to the Red and Silver Lines; 41.5 the compatibility of this expansion of the south Station Terminal and the proposal for eventual through routing of service to North station and /or Logan airport. 41.6 41.7
3) the partial expansion possibilities in the event that the US post Office continues to not agree with the proposed relocation to a new facility nearby, in order to accommodate the South Station expansion, without losing the local jobs in the postal facility 41.8
4) the sequence of improvements that will allow the quality and capacity of service to South Station to grow in the near term when, even with the full cooperation of the Post office in relocating, passenger demand will continue to grow, while capacity may diminish because of construction disruption, particularly in the intensively used Back Bay to South Station track and signal area. 41.9

I have a particular concern that there needs to be much more transparency about the potential to increase capacity in the interlocking. Massdot has announced a policy of tripling the mode share of transit use state wide, which implies more than tripling of passenger rail capacity to the high growth Seaport Innovation district, which is already overloading. The my auto capacity and causing problems with regional access to Logan. ye the DEIR shows a 50 per cent increase in track layout in South Station, but only about 30 to 35 per cent increase in passengers by the 2035 period, nowhere near enough to keep pace with either environmental or economic necessities. 41.10

There must be a hidden constraint. is there an assumption of inadequate rolling stock capacity? IS there a signal and track capacity constraint between Back Bay and South Station that is projected to constrain capacity? Is the commitment to maintain the option for eventual service to North Station and / or Logan constraining capacity? Or might me those extensions actually be needed to achieve the tripling and more of capacity needed for economic and environmental policies to be satisfied? Would the use of greater numbers of DMU services to Fairmont, to Needham, To west station and Newton add or complicate capacity? 41.11

Moreover, what about layup capacity which is a problem today? The only efficient near term option is to use Widett circle, which is close, and in the less complex southern direction. Readville may be essential, but how long. Will it take to be ape rational? Beacon Park may also be eventually important, but today and for a substantial construction period in Allston the Beacon Park Yard is separated from South station by a one track two way severely constrained link, which is likely to lose capacity during reconstruction. 41.12

I strongly agree with the priority that Massdot is placing on South Station expansion, but the very high importance of the expansion of capacity makes it essential to have much better information available for public understanding and comment than is available in the DEIR. consequently I urge that a supplemental document be filed to answer these questions, and provide opportunity to the public for informed comment on the proposed actions.

sincerely,
Frederick P. Salvucci

Sent from my iPad

Drew Volpe

35 Channel Center St.
Unit 505
Boston, MA 02210
drew@dewdrops.net

December 24, 2014

MEPA Office
Attn: Holly Johnson, EEA #15028
100 Cambridge St, Suite 900
Boston, MA 02114
holly.s.johnson@state.ma.us

Dear Ms. Johnson

I'm writing to comment on the South Station expansion project. I've lived near the project site in Fort Point for more than a decade and I walk to it every day on my way to work.

I love cities and urban neighborhoods. I'm very glad to see that all modes of transportation, not simply cars, are being considered. **In particular, a cycle track and harbor walk would be an immediate and large benefit.**

The current plan is thin on details of the architecture and design of the expansion. Given how visible this stretch of city and skyline are, I hope this is given more thought. **South Station is one of the central gateways to Boston.** A large number of visitors go across the Summer st. bridge every day whether their in town for a convention at the BCEC, visiting sites like the Children's Museum, the Tea Party Ship, or the ICA, or just are arriving via Amtrak or the Silverline from Logan and want to take in some of Boston. 42.1

The current appearance of that area does not do our city justice. Boston is the birthplace of the American revolution, public schools, anesthesia, modern Venture Capital, and so much more. **A historic, innovative city like our deserves to make a better first impression on visitors.** I hope this project will grow to include the world class design and architecture it should have. **In particular, I think this site would be perfect for a significant work of public art.** 42.2

Sincerely yours,

Drew Volpe

5.4. Response to Comments on the DEIR

This section provides responses to each comment identified in the comment letters included in Section 5.3, DEIR Comment Letters. For those comments that are addressed directly in the text of the FEIR, a section reference is provided. For those comments that are not addressed directly in the text of the FEIR, a response is provided within Table 5-2, Response to Comments. Comments have been transcribed exactly as found in the comment letters, complete with any erroneous spelling or other matter that might otherwise be taken as an error of transcription.

Table 5-2 — Response to Comments

Letter No.	Comment No.	Author	Comment	Response
0	C.01	MEPA	The FEIR should include a detailed description of the project and describe any changes to the project since the filing of the DEIR.	FEIR Sections 1.3, Summary of Project Changes since the DEIR, and 1.2, The Project, include a detailed description of the project and changes to the project since the filing of the DEIR.
0	C.02	MEPA	The FEIR should include updated site plans, if applicable, for existing and post-development conditions at a legible scale (80-scale or larger) for the South Station site, Widett Circle and Readville – Yard 2. These conceptual plans should include not only on-site work, but any proposed off-site work associated with transportation improvements. The FEIR should include plans at a legible scale clearly depicting each interlocking (Interlocking 1, Cove and Broad) that will be modified as part of SSX. These graphics should depict existing conditions at each interlocking, environmental or property ownership constraints that may influence their final design, and proposed modifications to trackwork.	FEIR Appendix D, *Track Configuration Alternatives Analysis – Tier 2 Screening Technical Report*, includes the requested graphics.
0	C.03	MEPA	The FEIR should discuss how the preferred interlocking design will eliminate or reduce delays in a scenario where a locomotive	FEIR Section 3.8.2, Terminal Track Configuration Alternatives Analysis, discusses the benefits of modified interlocking designs.

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			becomes disabled within its trackwork.	
0	C.04	MEPA	If updated ridership projections are available, the FEIR should summarize these changes and discuss how they may affect the overall project. The FEIR should address comments regarding the perceived discrepancy between increases in track layout capacity and future ridership projections.	Updated projections for South Station ridership have not been performed and hence are not available. FEIR Section 3.8.3, Track Layout Capacity and Future Ridership and Appendix F, *Transportation Documentation*, address the relationship between increases in track layout capacity and future ridership projections.
0	C.05	MEPA	It is unclear how the project design may be impacted if SSAR does not proceed prior to construction of SSX. The FEIR should include a discussion of how platform lengths, headhouse and concourse circulation and access from the surrounding neighborhood may be altered and how this may affect final project design.	FEIR Section 1.5.3, Update on the South Station Air Rights Project, provides this information.
0	C.06	MEPA	…the environmental impacts associated with the BPY layover facility will be reviewed in conjunction with the I-90 Allston Interchange project (EEA # 15278). The FEIR should include an update on the status of this project's funding, design, and MEPA review.	FEIR Section 1.5.4, I-90 Allston Interchange Project/Beacon Park Yard, provides this information.
0	C.07	MEPA	If the I-90 Allston Interchange project does not advance in a timely manner and MassDOT wishes to commence use of BPY in a manner beyond that specifically authorized in its agreement with Harvard University, a Notice of Project Change (NPC) may be required for the SSX project.	Comment noted.

Letter No.	Comment No.	Author	Comment	Response
0	C.08	MEPA	The FEIR should include an updated discussion of permitting requirements associated with the project and how the project will be constructed in accordance with applicable regulatory performance standards.	FEIR Section 1.6, Anticipated Permits and Approvals, includes a discussion of permitting requirements and compliance with applicable regulatory performance standards.
0	C.09	MEPA	The FEIR must include a selection of a Preferred Alternative. This Preferred Alternative should include both South Station improvements (i.e., platforms and track layout, interlocking upgrades, conceptual headhouse design, Dorchester Avenue improvements, and bicycle, pedestrian and intersection improvements) and selected layover facility locations.	FEIR Section 1.2, The Project, and Chapter 2, Project Design Updates, Cost, Funding, and Schedule, describe the preferred alternative ("the project") in detail.
0	C.10	MEPA	The FEIR should include the results of the Tier 2 terminal track configurations screening alternatives.	FEIR Section 3.8.2, Terminal Track Configuration Alternatives Analysis, and Appendix D, *Track Configuration Alternatives Analysis – Tier 2 Screening Technical Report*, discusses the results of the Tier 2 alternatives analysis.
0	C.11	MEPA	The FEIR should describe each modeled alternative, how it will meet Amtrak and the MBTA's future service plans, meet project OTP and delay goals, and allow parallel moves between Tower 1 Interlocking and the terminal.	FEIR Section 3.8.2, Terminal Track Configuration Alternatives Analysis, Appendix D, *Track Configuration Alternatives Analysis - Tier 2 Screening Technical Report*, and Appendix E, *Railroad Operations Analysis Technical Report*, discuss future service plans, on-time performance (OTP) and delay goals, and parallel moves.
0	C.12	MEPA	These alternatives should be evaluated based on their impacts to existing infrastructure, construction staging, capital and maintenance costs, and operations with respect to accommodating and coordinating	FEIR Section 3.8.2, Terminal Track Configuration Alternatives Analysis, and Appendix D, *Track Configuration Alternatives Analysis - Tier 2 Screening Technical Report,* discuss evaluation measures.

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			with other SSX project elements, including the station and midday layover facilities, and the SSAR project.	
0	C.13	MEPA	The FEIR should clarify how freight operations were incorporated into the evaluation of future service plans and access to and from the layover facilities.	FEIR Appendix E, *Railroad Operations Analysis Technical Report*, describes how operating windows for existing freight service within the project study area, as it operates today, were included in the operations analysis. These operating windows for freight service were not adversely impacted by the modeled future year passenger rail service plans.
0	C.14	MEPA	The FEIR should also include an assessment of platform capabilities and berthing abilities, including the number of platforms accessible to each track. The FEIR should note if platforms will not meet established MBTA and Amtrak requirements for longer trainsets. If these standards cannot be met, the FEIR should identify which tracks and platforms will be affected and how this may impact future operations and service capabilities.	FEIR Section 3.8.2, Terminal Track Configuration Alternatives Analysis, and Appendix D, *Track Configuration Alternatives Analysis – Tier 2 Screening Technical Report*, discusses platform berthing.
0	C.15	MEPA	MassDOT should provide an additional analysis of innovation mechanisms to extend platform lengths. The FEIR should identify which tracks/platforms may implement these techniques and estimated extension lengths. Selection of these techniques should be coordinated with project stakeholders, the FRA, Amtrak and the MBTA.	FEIR Section 3.8.2, Terminal Track Configuration Alternatives Analysis, and Appendix D, *Track Configuration Alternatives Analysis – Tier 2 Screening Technical Report*, discusses platform lengths.
0	C.16	MEPA	The FEIR should include a preferred South Station design alternative. The FEIR should	FEIR Section 1.2, The Project, describes the preferred South Station design alternative ("the project").

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			describe how the conceptual design is consistent with MassDOT's station design principles, project purpose and need, and established performance objectives. The FEIR should also present a preferred joint/private development alternative, based upon ongoing financial and real estate feasibility analyses.	FEIR Section 2.2, Consistency with Project Goals and Objectives, addresses project purpose and need, and established performance objectives. Section 2.1.4, Consistency with Updated Station Design Principles, discusses the application of design principles.
0	C.17	MEPA	The FEIR should include an expanded assessment of preferred layover facility operations based upon various combinations and capacities at Widett Circle, BPY, and Readville – Yard 2 to support the selection of a Preferred Alternative that meets the project's layover needs.	FEIR Section 3.8.4, Preferred Layover Facility Operations Assessment, provides this information.
0	C.18	MEPA	The FEIR should specifically address how the location and operations at any of the potential layover facility sites will impact Main Line services for Amtrak, the MBTA and freight services due to necessary train deadheading and midday storage requirements.	FEIR Section 3.8.5, Layover Location and Operations Impacts on Rail Services, and Appendix E, *Railroad Operations Analysis Technical Report*, describe the operations analysis conducted for the SSX project, which includes both revenue and non-revenue train trips,[1] and their impacts to commuter rail service along each south side line.
0	C.19	MEPA	The FEIR should also clearly identify proposed maintenance or other rail-related operations that will be undertaken at each layover yard. These activities, and their potential environmental impacts (e.g., industrial wastewater generation, noise impacts), should be accurately reflected in the environmental analyses prepared by MassDOT. The FEIR should clarify [if]	FEIR Section 3.8.6, Activities at Layover Facilities, and Appendix E, *Railroad Operations Analysis Technical Report*, detail the functions of the proposed layover facilities, which were assumed in the DEIR.

[1] Non-revenue is a railroad industry term used to describe the movement of equipment and/or crews between locations when trains are not in revenue service (such as to and from layover).

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			these activities were assumed in the DEIR, and if not, revise analyses accordingly in the FEIR.	
0	C.20	MEPA	The FEIR should include a phasing plan that addresses sequencing and timing of the potential layover facility sites based on operational need. This analysis should consider what available storage capabilities are presently afforded, or could be implemented in a No Build Alternative, to MassDOT at these facilities, noting that use of the layover facility at BPY is subject to an agreement with Harvard University.	FEIR Section 3.8.7, Layover Phasing Plan, describes a phasing plan for layover facility construction.
0	C.21	MEPA	MassDOT, in a collaborative effort with the City of Boston, should expand its public outreach specifically to [the residents surrounding the Readville – Yard 2 layover facility] prior to selection of a Preferred Alternative.	FEIR Section 1.5.1, Update on Public Outreach Activities, describes MassDOT's expanded public outreach to residents and businesses surrounding the Readville – Yard 2 layover facility.
0	C.22	MEPA	…[T]he FEIR should include an update on outreach efforts to property owners and potentially displaced business owner at Widett Circle.	FEIR Section 1.5.1, Update on Public Outreach Activities, includes an update on outreach efforts to business owners at Widett Circle.
0	C.23	MEPA	As part of the FEIR, I encourage MassDOT to consider additional ways to reduce impacts to environmental resources through design modification or the addition of features to further mitigate potential impacts.	FEIR Section 4.3, Project Mitigation, discusses how impacts will continue to be minimized to the greatest extent practicable.
0	C.24	MEPA	The FEIR should discuss steps MassDOT has taken to further reduce the impacts of the project since the filing of the DEIR, or if certain measures are infeasible, the FEIR should discuss why	FEIR Section 4.3, Project Mitigation, provides this information.

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			these measures will not be adopted.	
0	C.25	MEPA	The FEIR should describe the interrelationship of the Preferred Alternative with the SSAR project.	FEIR Section 1.5.3, Update on the South Station Air Rights Project, provides this information.
0	C.26	MEPA	…the FEIR should provide additional analysis of how proposed platform lengths, column placement, passenger waiting areas, and passenger access points are reliant on either action to be undertaken by SSAR or MassDOT and discuss contingencies in MassDOT's Preferred Alternative design if SSAR does not proceed prior to the SSX project.	FEIR Section 1.5.3, Update on the South Station Air Rights Project, provides this information.
0	C.27	MEPA	The FEIR should identify the extent of proposed land takings associated with the project at Widett Circle and Readville – Yard 2. The FEIR should characterize the existing conditions on these properties and demonstrate that takings have been limited to the extent practicable given MassDOT's proposed programming needs.	FEIR Section 3.3, Land Use and Property, discusses proposed land acquisitions.
0	C.28	MEPA	The FEIR should discuss MassDOT's legal and regulatory obligations associated with private property takings and describe how MassDOT intends to meet these requirements going forward with the Preferred Alternative.	FEIR Section 3.3.4, MassDOT's Legal and Regulatory Obligations, addresses these issues.
0	C.29	MEPA	The FEIR should identify the extent and location of known easements, particularly those associated with water and sewer infrastructure, within the SSX project area, clarify how these	FEIR Section 3.3, Land Use and Property, discusses known easements.

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			easements may impact project construction and operations, and ensure ongoing access to these utilities by the MWRA and/or BWSC for maintenance.	
0	C.30	MEPA	MassDOT should reevaluate the feasibility of additional intersection mitigation measures to further reduce the number of intersections in the study area that currently, or in the future, operate at LOS E and F. If additional mitigation is not proposed, the FEIR should discuss why mitigation measures are infeasible.	FEIR Section 3.9.2, Intersection Mitigation Feasibility Analysis, provides this information.
0	C.31	MEPA	The FEIR should update proposed TDM measures, traffic-related elements of the proposed CMP, or other relevant traffic mitigation measures as necessary to reflect final design elements of the Preferred Alternative.	FEIR Section 3.9.3, Transportation Demand Management Commitments, and Appendix G, *Construction Management Plan*, updates proposed TDM measures and traffic-related elements of the proposed CMP, respectively.
0	C.32	MEPA	The FEIR should provide additional data supporting the assumption that approximately 30% to 40% of South Station-bound traffic trips will be diverted to a reopened Dorchester Avenue in the Build Alternatives.	FEIR Section 3.9.5, Trip Diversion to Dorchester Avenue, discusses this issue.
0	C.33	MEPA	The FEIR should include graphics identifying proposed routes to and from South Station from key roadways and locations such as South Boston, I-93 north, I-93 south, and the MassPike.	FEIR Chapter 2, Project Design Updates, Cost, Funding, and Schedule, includes Figure 3-18, which depicts the distribution of motor vehicle trips to and from South Station.

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0	C.34	MEPA	The FEIR should also include conceptual plans at a legible scale for any proposed transportation improvements that clearly identify lane widths, expanded areas of pavement or removal of medians/open space, traffic signals, pedestrian, bicycle, and transit accommodations. This information is necessary to confirm that adequate area is available to ensure the viability of proposed infrastructure improvements and transportation mitigation measures.	FEIR Chapter 1, Introduction and Project Summary, includes Figure 1-7, which depicts the concept plan for Dorchester Avenue. Chapter 3, Environmental Analyses, includes Figure 3-17, which depicts traffic mitigation measures at the South Station site.
0	C.35	MEPA	The FEIR should include detailed conceptual plans for Dorchester Avenue that clearly indicate the location of and describe available curbside capacity for taxi cabs, MBTA buses, shuttle services, and passenger vehicle drop-off and pick-up.	FEIR Chapter 1, Introduction and Project Summary, includes Figure 1-7, which depicts the concept plan for Dorchester Avenue.
0	C.36	MEPA	The FEIR should discuss how curbside drop-off/pick-up areas will be accessed and designed to avoid conflict with bus operations, pedestrians and bicyclists.	FEIR Section 3.9.6, Curbside Drop-Off/Pick-Up Area Design, provides this information.
0	C.37	MEPA	The FEIR should describe how a reopened Dorchester Avenue may be used to reroute MBTA buses to provide more direct bus connections to downtown.	FEIR Section 3.9.7, Use of Dorchester Avenue by MBTA Buses, provides this information.
0	C.38	MEPA	The FEIR should demonstrate that the preferred South Station design will mitigate existing or potential areas of congestion and poor pedestrian LOS, including projected pedestrian congestion on at-grade rail platforms, within the rail head concourse, and connections to the Silver Line	FEIR Section 2.1.1, Update on South Station Headhouse Design, describes how the preferred design will mitigate areas of pedestrian congestion.

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			and Red Line platforms in the Build Alternatives.	
0	C.39	MEPA	…the FEIR should discuss the current planning (State and federal) and funding status for the NSRL and provide additional detail on how the Preferred Alternative will be designed to ensure that its future construction is not precluded. This discussion should include how platform, concourse, headhouse and circulatory routes may be incorporated into potential future access to additional subterranean tracks, or at a minimum, will not preclude construction of future tunnels and support structures.	As stated in FEIR Section 1.5.5, North/South Rail Link Project, MassDOT's *draft 2017 – 2021 Capital Investment Plan* (CIP) has $2.0 million programmed for a North/South Rail Link corridor and area planning study. The SSX project continues to commit to expanding South Station in such a way that the goals of the project can be met without eliminating the potential for future underground infrastructure, such as tunnel portals and station locations, which may be associated with the North/South Rail Link project.
0	C.40	MEPA	MassDOT should continue to refine pedestrian and bicycle connection plans between South Station and adjacent streets, the Harborwalk, and through and around South Station to the adjacent neighborhoods (i.e., Fort Point Channel, Seaport District, South Boston, Chinatown, Leather District, etc.). The FEIR should clearly identify these routes and accommodations (e.g., bicycle lanes) and note how the design of the South Station headhouse will enhance these connections.	FEIR Section 3.9.8, Pedestrian and Bicycle Connections, describes the project's enhancements to pedestrian and bicycle connections and facilities.
0	C.41	MEPA	The FEIR should provide additional detail on the conceptual sizing and location of the proposed long-term and short-term bicycle parking, including the anticipated number of bicycle parking spaces based upon mode-share data for South Station.	FEIR Section 3.9.9, Bicycle Parking, provides this information.

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0	C.42	MEPA	The FEIR should clarify elements of the proposed monitoring program, including the types of data to be evaluated, frequency of monitoring, steps to provide further mitigation if anticipated operations and mode share splits are not achieved, and distribution of the reports….I recommend that MassDOT commit to conducting a monitoring program for all Build Alternatives (Alternatives 1, 2, and 3).	FEIR Section 3.9.4, Traffic Monitoring, provides this information.
0	C.43	MEPA	The FEIR should identify the location and type of wetlands resource areas on the South Station and layover facility sites, delineated in accordance with the WPA and describe how the project will be constructed in accordance with applicable wetland resource area performance standards.	FEIR Section 3.4, Wetlands, discusses the location and type of all jurisdictional wetlands.
0	C.44	MEPA	The FEIR should clarify the jurisdiction of the potential isolated vegetated wetland on the Readville – Yard 2 site. If alteration of this wetland requires a 401 WQC, [it] should discuss how MassDOT will meet the 401 WQC regulations and any applicable performance standards.	FEIR Section 3.4, Wetlands, provides this information.
0	C.45	MEPA	The FEIR should discuss the outcomes of the master planning process required in the MHP Phase 2 Decision and the subsequent anticipated MHP Amendment….	The Preferred Alternative is in compliance with Chapter 91 regulations and therefore does not require an amendment to the MHP.

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0	C.46	MEPA	The FEIR should include conceptual design plans, graphics and a supporting narrative for the Preferred Alternative that details the location of uses within the building on tidelands and facilities dedicated for public use consistent with c.91 regulatory requirements and/or the MHP Amendment….	FEIR Section 3.5.2, Chapter 91 Licensing Criteria, describes the regulatory requirements for nonwater-dependent structures. In addition, the Preferred Alternative is in compliance with Chapter 91 regulations and therefore does not require an amendment to the MHP.
0	C.47	MEPA	The FEIR should include an updated discussion demonstrating how the South Station site will be designed to meet the c.91 licensing criteria for a nonwater-dependent (transportation improvements, joint/private development) and water-dependent (Harborwalk extension) uses.	FEIR Section 3.5, Chapter 91 Waterways and Tidelands, provides this information.
0	C.48	MEPA	…[D]uring the MHP Amendment process, a shadow analysis should be completed using the full envelope of possible Alternative 3 build out. …	The Preferred Alternative is in compliance with Chapter 91 regulations and therefore does not require an amendment to the MHP.
0	C.49	MEPA	The FEIR should discuss the feasibility of extending water taxi service to South Station. … The FEIR should discuss how this determination may impact potential water transportation access to the South Station site.	FEIR Section 3.9.11, Water Transportation, discusses the project's approach to water transportation access.
0	C.50	MEPA	The FEIR should include an updated discussion of how the project complies with the Public Benefit Determination (301 CMR 13.00) criteria established for non-water-dependent projects located completely or partially within tidelands or landlocked tidelands based upon the selection of Preferred Alternative for the project (South Station site	FEIR Section 3.5.3, Assessment of Public Benefits, provides an updated discussion regarding the project's compliance with the Public Benefit Determination criteria.

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			and Widett Circle). ... Specifically, the FEIR should include a discussion of: the purpose and effect of the project, impact of the project on abutters and the surrounding community, enhancement to the property, benefits to the public trust rights in tidelands, benefits provided through previously obtained municipal permits, community activities on the South Station site, environmental protection and preservation, and public health, safety, and general welfare.	
0	C.51	MEPA	The FEIR should include a complete stormwater report, with supporting data and graphics, for the South Station and layover facility sites. This analysis should demonstrate compliance with MassDEP's SMS, as applicable and the guidance presented in the MassDEP comment letter regarding compliance with the redevelopment standards.	Appendix A, *Stormwater Analysis Technical Report*, includes plans for the South Station site and the two layover facility sites. All project sites will be designed to comply with the MassDEP Stormwater Management Standards.
0	C.52	MEPA	MassDOT should gather necessary on-site soils and hydrology data to demonstrate the feasibility of surface or subsurface stormwater management best management practices (BMPs). If feasible, the FEIR should incorporate these BMPs into the stormwater management system design.	FEIR Section 3.6, Water Quality and Stormwater, and FEIR Appendix A, *Stormwater Analysis Technical Report,* discusses preliminary soil information and hydrology. Conceptual BMPs were designed based on this information.
0	C.53	MEPA	The FEIR should clarify which proposed BMPs will specifically be implemented within the project to meet the total maximum daily load (TMDL) and Land Uses of Higher Potential Pollutant Load	Section 3.6, Water Quality and Stormwater, and Appendix A, *Stormwater Analysis Technical Report*, describe BMPs that will be implemented to meet TMDL and LUHPPL requirements, as well as conceptual BMP designs.

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			(LUHPPL) requirements. The stormwater management report should include conceptual BMP designs.	
0	C.54	MEPA	If climate change adaptation and resiliency measures include designing the stormwater management system to accommodate more frequent and intense storm events, the FEIR should explain how this measure was accounted for in the stormwater management report.	FEIR Section 3.10.4, Stormwater Management Adaptation and Resiliency Measures, describes the data used to design the stormwater system.
0	C.55	MEPA	The FEIR should include improved graphics at a legible scale identifying the location of project area stormwater infrastructure (i.e., pipes, easements and outfall locations) and CSO connection locations.	FEIR Chapter 3, Environmental Analyses, includes Figure 3-6, Existing Stormwater Infrastructure - South Station, which depicts stormwater infrastructure and CSO connection locations.
0	C.56	MEPA	The FEIR should describe the condition of the stormwater and CSO pipes and outfalls to Fort Point Channel to ensure the feasibility of their use in conjunction with the project.	FEIR Section 3.6, Water Quality and Stormwater, includes information regarding the condition of the stormwater and CSO outfall pipes.
0	C.57	MEPA	MassDOT should work with the BWSC to assess the feasibility and potential stormwater management benefit of constructing a dedicated drainage system for the South Station and Readville – Yard 2 sites. MassDOT should present the results of this analysis in the FEIR.	FEIR Section 3.6.5, Potential Dedicated Drainage Systems, describes the dedicated drainage systems planned for the South Station and Readville – Yard 2 sites.
0	C.58	MEPA	The FEIR should report on the outcome of soil investigations undertaken to determine the infiltration capabilities and overall suitability of the existing	FEIR Section 3.6.3, Soil Conditions and Infiltration Capacity, describes the outcome of soil investigations and the suitability of existing soils for the implementation of surface stormwater BMPs.

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			soils for the implementation of surface stormwater BMPs.	
0	C.59	MEPA	The FEIR should also evaluate the current condition of the 54-inch drainage pipe at Readville – Yard 2 and discuss whether it will be relocated in conjunction with the layover facility expansion. Related proposed conditions plans should reflect this infrastructure change, if applicable.	FEIR Section 3.6.6, Readville – Yard 2 Storm Drain Condition, discusses the drainage pipes at that location.
0	C.60	MEPA	The FEIR should include an additional evaluation of the feasibility of surface or subsurface detention, retention, and/or filtration systems at the Readville – Yard 2 layover site.	FEIR Section 3.6.3, Soil Conditions and Infiltration Capacity, describes the outcome of soil investigations and the suitability of existing soils for the implementation of surface stormwater BMPs.
0	C.61	MEPA	The FEIR should include an assessment of the existing drainage system outfalls to Fort Point Channel to confirm their feasibility for reuse as part of the project, conceivably under a different set of conditions than their original design (e.g., elevated tail water or storms with greater precipitation frequencies).	FEIR Section 3.6.2, Existing Drainage and Combined Sewer Systems, assesses the existing outfalls to Fort Point Channel.
0	C.62	MEPA	The FEIR should discuss how climate change and storm adaptation and resiliency measures will be selected and implemented, either as part of the original project design, or within the design life of the project, with a clear commitment to implementation by MassDOT... *[see MEPA scope for greater detail]*	FEIR Section 3.10, Climate Change, discusses the selection and implementation of adaptation and resiliency measures.
0	C.63	MEPA	If the proponent is considering raising the base level of the site, MassDOT should study the potential flooding impacts to	While the base level of the site will not be raised, the project does include a proposal to raise a section of the seawall along Dorchester

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			adjacent sites and identify these potential impacts in the FEIR.	Avenue. The impact of this action is described in FEIR Section 3.10.1, Vulnerability Assessment Comparison.
0	C.64	MEPA	The FEIR should include a sensitivity analysis comparing the results of this vulnerability assessment and its associated model, the Boston Harbor Flood Risk Model, with that presented in the DEIR to determine if the extent of potential flooding during the evaluated scenarios encompasses a larger than anticipated area.	FEIR Section 3.10, Climate Change, discusses the results of the Boston Harbor Flood Risk Model.
0	C.65	MEPA	The FEIR should provide additional data on the potential depths of inundation within the SSX project area in the 100-year, 100-year plus two feet of sea level rise, and hurricane modeled events.	FEIR Section 3.10, Climate Change, discusses potential inundation levels with two feet of sea level rise and hurricane modeled events.
0	C.66	MEPA	The FEIR should include a table further clarifying existing and proposed project-related wastewater flows, including those that may currently be attributable to the USPS facility and those identified as part of the SSAR project.	FEIR Section 3.7, Water Use and Wastewater, includes a table further clarifying the existing and proposed wastewater generations at the South Station site.
0	C.67	MEPA	The FEIR should demonstrate that any proposed changes to the physical configuration, location, and/or hydraulic performance of sewers and outfalls will not affect compliance with Federal Court mandates and regulatory requirements.	FEIR Section 3.7, Water Use and Wastewater, includes findings from a preliminary investigation of the sanitary sewer and outfall capacity.

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0	C.68	MEPA	The DEIR identified potential impacts from sea level rise and coastal storms to CSOs and MWRA facilities indicating that three CSO outlets to Fort Point Channel near the South Station site may require additional mitigation measures to minimize seawater entering back into the CSO lines. The FEIR should describe in further detail the nature, potential scope, and location of these impacts and identify potential mitigation measures and the anticipated responsible party.	FEIR Section 3.10.5, Mitigating the Impact of Sea Level Rise on Combined Sewer Overflows, addresses these issues.
0	C.69	MEPA	The FEIR should clarify potential water use and wastewater generation at the proposed layover facilities based upon operational programming (e.g., car washing).	FEIR Section 3.7, Water Use and Wastewater, includes a tables and a clarifying statement explaining wastewater generation.
0	C.70	MEPA	The FEIR should identify any additional permitting requirements if industrial wastewater discharges are proposed as part of the project and discuss BMPs that could be implemented to reduce water use and wastewater discharges (e.g., use of recycled wash water).	FEIR Section 3.8.6, Activities at Layover Facilities, indicate that the project does not include industrial waste discharges.
0	C.71	MEPA	The FEIR should clarify if the air quality analysis conducted in the DEIR considered the potential concentration of air pollutants within the platform and track area at South Station subsequent to the construction of Build Alternatives 2 or 3. If this analysis did not evaluate this condition, the FEIR should include supplemental analyses of criteria pollutants, UFPs and DPM in the Build Condition.	FEIR Section 3.11.2, Concentration of Air Pollutants, addresses this comment.

Letter No.	Comment No.	Author	Comment	Response
0	C.72	MEPA	The FEIR should discuss how the preferred station design and South Station platform and track layout will not alter the anticipated noise and vibration characteristics of the site modeled in the DEIR. If the Preferred Alternative will alter these modeling results, the FEIR should include an updated noise and vibration analysis conducted in accordance with FRA and MassDEP requirements to ensure that appropriate mitigation measures are provided.	FEIR Section 3.12.2, Modeled Noise and Vibration Characteristics, explains that the results of the noise modeling analysis remain unchanged from the DEIR.
0	C.73	MEPA	Conceptual plans in the FEIR should indicate the location, type and elevation of proposed noise barriers within the SSX project areas.	FEIR Section 3.12.3, Potential Mitigation Measures, provides this information. These noise barriers are depicted in Figures 3-25 and 3-26.
0	C.74	MEPA	The FEIR should identify how station design elements will provide noise mitigation in interior spaces.	FEIR Section 3.12.1, Impact Summary, addresses noise mitigation in interior spaces.
0	C.75	MEPA	The FEIR should discuss whether MassDOT will implement noise and operational BMPs equal to or more stringent than those currently utilized at other layover facilities along the commuter rail. MassDOT should confirm that a forum for citizen complaint will be implemented as a BMP in the operational plan for any proposed layover facilities and at South Station. The FEIR should identify these proposed BMPs and note any contractual obligations associated with the operator of the MBTA's commuter rail.	FEIR Section 3.12.4, Noise and Vibration Operational Best Management Practices, provides this information.
0	C.76	MEPA	The FEIR should include a feasibility assessment of potential mitigation measures, a phasing	FEIR Section 4.3, Project Mitigation, addresses this issue.

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			plan for their implementation, and identification of responsible parties for their construction and maintenance.	
0	C.77	MEPA	The FEIR should include a clear and complete listing of modeling inputs (e.g., R-values, U-values, efficiencies, lighting power density, etc.) for items such as equipment, walls, ceilings, windows, lighting, HV AC units, etc. that were modeled in the Baseline Case and Build with Mitigation Case to allow for an easier comparison with Building Code requirements.	FEIR Section 3.13.2, Building Energy Modeling Details, includes a table of the requested modeling inputs.
0	C.78	MEPA	The FEIR should clarify the calculated total energy use estimates for the Joint/Private Development projects. *[see MEPA scope for greater detail]*	The Joint/Private Development alternative was not selected, and is not analyzed in this FEIR.
0	C.79	MEPA	The DEIR noted that the preliminary project design did not include modifications to, or ventilation connection with, the existing South Station facilities. The FEIR should confirm if the preferred station design maintains this separation. *[see MEPA scope for greater detail]*	FEIR Section 2.1.3, Ventilation System Configuration, provides this information.
0	C.80	MEPA	The FEIR should include additional analysis of technical and economic feasibility of the following potential renewable energy sources: Veolia steam network connections, including the use of steam to power absorption chillers; Solar PV or solar hot water (SHW) installations; and On-site CHP, including CHP-serving absorption chillers. *[see MEPA scope for greater detail]*	FEIR Section 3.13.3, Feasibility of Veolia Steam Use; Section 3.13.4, Feasibility of Solar Photovoltaic Installation; Section 3.13.5, Feasibility of Solar Hot Water Installation; and Section 3.13.6, On-Site Combined Heat and Power, provide this information.

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0	C.81	MEPA	The FEIR should include at a minimum a commitment to construct buildings to be "solar ready" to facilitate future installation of PV systems. If PV is not financially feasible, I request that MassDOT commit to revisit the PV financial analysis on a regular timetable and to implement PV when the financial outcomes meet specified objectives.	Section 3.13.4, Feasibility of Solar Photovoltaic Installation, provides this information.
0	C.82	MEPA	The FEIR should include an updated draft tenant manual to reflect the elements of the Preferred Alternative, the recommendations from MassDEP (if feasible), and any potential modifications to the proposed ownership and/or tenant leasing structure.	The draft tenant manual included in the DEIR provided guidelines to encourage tenants to minimize energy use in the Joint/Private Development alternatives. The Joint/Private Development alternatives were not selected, therefore an updated draft tenant manual is not included in this FEIR.
0	C.83	MEPA	The mobile source emissions analysis should be revised to account for indirect electrical use associated with the proposed plug-in facilities at South Station and the layover sites. *[see MEPA scope for greater detail]*	FEIR Section 3.13.7, Effect of Locomotive Plug-Ins, provides this information.
0	C.84	MEPA	The FEIR should clarify which standards MassDOT must adhere to in the final design process and those which are merely informational. The FEIR should clarify how the project intends to meet these standards given, in some cases, the outdated benchmarks (e.g., ASHRAE 90.1-2004 for LEED Plus) compared to current Massachusetts Stretch Code standards.	FEIR Section 3.13.9, Applicable Energy Codes, Standards, and Rating Systems, provides this information.

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0	C.85	MEPA	The FEIR should also clarify which sustainable infrastructure rating system MassDOT intends to adopt to ensure the project design meets targeted sustainability goals.	FEIR Section 3.13.9, Applicable Energy Codes, Standards, and Rating Systems, provides this information.
0	C.86	MEPA	The FEIR should describe how the preferred station design will mitigate potential impacts to historic resources. *[see MEPA scope for greater detail]*	FEIR Section 3.14, Historic Resources, provides this information.
0	C.87	MEPA	The FEIR should provide an update on the Section 106 review process and identify proposed mitigation measures for impacts to historic architectural resources.	FEIR Section 1.5.2, Update on the Section 106 Review Process, and Section 3.14, Historic Resources, provide this information.
0	C.88	MEPA	Interim correspondence and project renderings between the FRA, MHC and/or City historic review authorities should be provided as an appendix for reference.	There has been no correspondence among FRA, MassDOT, MHC, and BLC since MHC's letter to FRA, dated December 23, 2014.
0	C.89	MEPA	If any Recognized Environmental Conditions (RECs) are identified [during the Phase 1 ESAs], the FEIR should include a draft site-specific health and safety plan (SSHASP).	FEIR Appendix C, *Hazardous Materials Documentation*, includes draft SSHASPs.
0	C.90	MEPA	MassDOT should conduct any Phase II ESA's identified subsequent to the Phase I ESA process and present the results as part of the FEIR.	FEIR Section 3.15, Site Contamination and Hazardous Materials, notes that Phase II ESAs were not conducted due to lack of site access.
0	C.91	MEPA	If a Phase II is required, the FEIR should identify the components of a draft soil and groundwater sampling and analysis program to ensure compliance with the MCP and inform the selection of mitigation measures proposed in	FEIR Section 3.15, Site Contamination and Hazardous Materials, notes that Phase II ESAs were not conducted due to lack of site access.

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			conjunction with the project or the construction process.	
0	C.92	MEPA	The FEIR should specifically discuss how MCP-regulated conditions may impact construction techniques (i.e., dewatering, foundation types, etc.) or potential site infrastructure (e.g., groundwater and stormwater management) in the Preferred Alternative.	FEIR Section 3.15.3, Impacts on Construction Techniques, provides this information.
0	C.93	MEPA	The FEIR should discuss the potential implications of the Activity and Use Limitation (AUL) on the Readville – Yard 2 site. The FEIR should identify the responsible party, plans for remediation, and how compliance with the MCP may impact layover facility design or the construction timeline.	FEIR Section 3.15.4, Implications of the Activity and Use Limitation at Readville – Yard 2, provides this information.
0	C.94	MEPA	The FEIR should include an evaluation and description of potential construction period access locations and laydown areas for station, rail and layover facilities…. The FEIR should also describe how Amtrak, MBTA commuter rail and light rail, bus, and freight service will be modified and accommodated during project construction ... *[see MEPA scope for greater detail]*	FEIR Section 3.16, Construction Impacts, and Appendix G, *Construction Management Plan*, discuss access and accommodations during construction.
0	C.95	MEPA	I strongly encourage MassDOT to commit to monitoring noise and vibration levels after service starts (with the proposed mitigation in place) to evaluate whether actual noise and vibration levels correspond with the modeled values.	FEIR Section 3.12.5, Noise and Vibration Monitoring, discusses this issue.

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0	C.96	MEPA	MassDOT should indicate how appropriate corrective actions may be determined and implemented if actual [noise] values are found to be higher than the projections.	FEIR Section 3.12.5, Noise and Vibration Monitoring, discusses this issue.
0	C.97	MEPA	The FEIR should include a revised draft CMP, as necessary, to reflect the elements of the Preferred Alternative. *[see MEPA scope for greater detail]*	FEIR Appendix G, *Construction Management Plan,* provides a revised draft CMP.
0	C.98	MEPA	The FEIR should include a separate chapter summarizing proposed mitigation measures. This chapter should also include draft Section 61 Findings for each State Agency that will issue permits for the project.	FEIR Chapter 4, Proposed Section 61 Findings and Mitigation, provides this information.
0	C.99	MEPA	The FEIR should contain clear commitments to implement mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and contain a schedule for implementation. *[see MEPA scope for greater detail]*	FEIR Chapter 4, Proposed Section 61 Findings and Mitigation, provides this information.
0	C.100	MEPA	The project includes a variety of public-realm infrastructure improvements. The FEIR should include a conceptual long-range maintenance plan for these public-realm improvements, including identification of responsible parties, to ensure adequate upkeep of these project-related improvements. If a long-term maintenance plan structure is unknown, the FEIR should include a commitment by the MassDOT to work with the City and neighborhood associations to establish a plan.	FEIR Section 3.9.10, Maintenance of Public Realm Infrastructure, addresses this issue.

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0	C.101	MEPA	I require proponents to provide a self-certification to the MEPA Office indicating that all of the required mitigation measures, or their equivalent, have been completed. … The commitment to provide this self-certification in the manner outlined above should be incorporated into the draft Section 61 Findings included in the FEIR.	FEIR Section 4.2, Proposed Draft Section 61 Finding, provides this information.
1	1	MassDEP NERO	The DEIR indicates that the existing 22,720 gpd of wastewater flow eliminated with demolition of the post office would off-set this increase. Since it is unclear whether a deduction in wastewater flow has been taken for the post office, and the increase of the other alternatives are not included, it is requested that the FEIR provide a clear table showing the differences and changes in wastewater flow generation by the proposed project. The table should include the actual existing wastewater flow, the estimated increase in wastewater from the previously approved SSAR project, the wastewater increase for the preferred expansion project alternatives, and the off-set reduction in wastewater flow from the elimination of the post office. These data should be tallied to show the increase in wastewater generated by the preferred alternative for the South Station expansion project.	FEIR Section 3.7, Water Use and Wastewater, includes a table clarifying the existing and proposed wastewater generations at the South Station site.
1	2	MassDEP NERO	The FEIR should be clearer about the water quality treatment trains proposed, considering that there are TMDL established for the waterbodies where stormwater	FEIR Appendix A, *Stormwater Analysis Technical Report*, includes a detailed explanation of proposed water quality treatment and how the TMDLs are being addressed.

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			will be discharged, and that catch basins provide only limited water quality treatment.	
1	3	MassDEP NERO	In the absence of conceptual stormwater control plans or additional information, it is requested that the FEIR explain why deficiencies in the stormwater management systems would be unavoidable. If it can be demonstrated that full compliance cannot be achieved, then it must be clear that the highest practical level of stormwater management is being provided. For compliance with the stormwater management standards, it is necessary to support a claim that stormwater standards in the wetlands regulations at 310 CMR 10.05(6)(k) are met to the maximum extent practicable and improve existing conditions to comply with 310 CMR 10.05(6)(k)7 and 310 CMR 10.05(6)(0)(2).	FEIR Section 3.6, Water Quality and Stormwater, and Appendix A, *Stormwater Analysis Technical Report*, discuss stormwater management.
1	4	MassDEP NERO	It is requested that conceptual plans of [the ditch/subdrain & drip pan] system design be included in the FEIR. In addition, it should be confirmed that the stormwater discharge from this rail track area and all layover facilities is to the sewer system.	FEIR Section 3.6, Water Quality and Stormwater, includes a clarifying statement noting that all stormwater discharge from the rail track area and from all layover facilities is to the sanitary sewer system. Conceptual plans of the ditch/subdrain and drip plans are in the preliminary stages and are not available for inclusion in the FEIR at this time.
1	5	MassDEP NERO	MassDEP appreciates that consideration is being given to pervious pavers with underdrains for sidewalks and the proposed Harborwalk along Dorchester Avenue. However, the FEIR should make it clear that pavers	FEIR Appendix A, *Stormwater Analysis Technical Report*, states that where infiltration would not be appropriate on contaminated sites, it would be restricted.

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			and infiltration systems will not be used in areas of site contamination, where stormwater runoff would come into contact with significant pollutant sources.	
1	6	MassDEP NERO	Given the vulnerability of the coastline near the proposed project site, MassDOT will need to anticipate the impacts of sea level rise and the potential for damage to the Commonwealth's transportation infrastructure, personal property, and businesses, due to storm surge, flooding, and an eroding shoreline.	FEIR Section 3.10.1, Vulnerability Assessment Comparison, includes an analysis of the impacts of projected sea level rise.
1	7	MassDEP NERO	It may be appropriate to reconsider the project design vulnerabilities to flooding using more conservative sea level rise parameters, particularly to ensure that the critical public transportation facilities will be sufficiently resilient over the life span of the project. At a minimum, it is requested that the FEIR explain the rationale for the sea level rise(s) selected, and how the information will be used, and/or revised during the project design process, to ensure that the mitigation measures and strategies deployed will be adequate to adapt the project to future flooding conditions and minimize impacts.	FEIR Section 3.10.1, Vulnerability Assessment Comparison, includes an analysis of projected sea level rise using the Boston Harbor Flood Risk Model. As part of the ENF Certificate, MEPA and CZM s recommended that MassDOT evaluate the impacts of a potential sea level rise scenario of two feet.
1	8	MassDEP NERO	As some measures identified could have major impacts and/or indirect impacts on nearby areas, (e.g., floodwater control dike surrounding the site and raising the base elevation of the site)...The potential impacts of the [flooding] mitigation also	MassDOT recognizes the potential impacts to abutting properties from certain floodwater control mechanisms and will address these issues as strategies are developed.

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			should be given further consideration.	
1	9	MassDEP NERO	The DEIR has not explained whether the base flood elevations in the vulnerability assessment (i.e., 10-13 feet NAVD 88) are from the Federal Emergency Management Agency (FEMA) Flood Insurance, 2009 Rate Map, the 2013 map, or a combination of both FEMA maps. For consistency with the revised wetlands regulations (October 24, 2014), pursuant to the definition of Special Flood Hazard Area, 310 CMR 10.04, it should be clear that "(t)he best available information, including, but not limited to the currently effective or preliminary Federal Emergency Management Agency (FEMA) Flood Insurance Study or Rate Map (except for any portion of a preliminary map that is subject of an appeal to FEMA) for Land Subject to Coastal Storm Flowage, is used in the empirical analysis.	FEIR Section 3.10.1, Vulnerability Assessment Comparison, clarifies which FEMA maps were used in the DEIR vulnerability analysis, and provides additional analysis based on the March 16, 2016 Flood Insurance Rate Maps (FIRMs).
1	10	MassDEP NERO	The opportunities to incorporate renewable energy sources into the project at this time appear to be limited. In the event that circumstances become more favorable, MassDOT is encouraged to continue to pursue renewable energy during the design process.	FEIR Section 3.13, Greenhouse Gas Emissions, reviews the feasibility of the use of solar PV, solar hot water, and onsite CHP.
1	11	MassDEP NERO	The potential to the Veolia district steam appears to be feasible and the FEIR should explain whether MassDOT will continue to pursue this option.	FEIR Section 3.13.3, Feasibility of Veolia Steam Use, provides this information.

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1	12	MassDEP NERO	MassDEP recognizes the proponent's commitment to charging market rates, providing electric vehicle charging stations, expanding bicycle and car share programs on site, and providing other amenities necessary to promote bicycle, pedestrian and transit trips consistent with MassDOT's GreenDOT Policy. However, MassDEP urges the proponent to explore additional measures in order to produce further trip reduction and associated emissions and maximize the significant opportunity for TOD that South Station presents.	The project does not include joint development, no longer proposes 242 parking spaces at the site, and substantially improves non-auto accommodations (transit, pedestrian, bus, and bicycle). As discussed in FEIR Section 3.9.8, Pedestrian and Bicycle Connections, and Section 3.9.9, Bicycle Parking, the proposed cycle track, along the reopened segment of Dorchester Avenue, would connect with existing bicycle infrastructure and complement future plans by the City. Existing Hubway bicycle sharing stations would complement the new cycle track and plans for bicycle parking within the expanded headhouse. In addition, as described in FEIR Section 3.9.2, Intersection Mitigation Feasibility Analysis, and Section 3.9.3, Transportation Demand Management Commitments, MassDOT has committed to making several intersection improvements and will implement Traffic Demand Management activities that will further reduce trip generation and associated emissions.

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1	13	MassDEP NERO	MassDEP recommends that the FEIR address the following measures for consideration in the proposed Tenant Manual: • Offer parking cash-out incentives as opposed to parking discounts to employees whose parking is provided. This strategy by employers/tenants provides employees with an option for compensation for not utilizing dedicated parking spaces, thus supporting and encouraging employees to seek travel modes other than driving alone to work. • Offer alternative work schedules to employees as well as staggered work shifts, where appropriate, to reduce peak period traffic volumes. • Provide direct deposit for employees. • Provide a guaranteed ride home to those employees who regularly commute by transit, bicycle, or vanpool to the site and who have to leave work in the event of a family emergency or leave work late due to unscheduled overtime.	The draft tenant manual included in the DEIR provided guidelines to encourage tenants to minimize energy use in the Joint/Private Development alternatives. The Joint/Private Development alternatives were not selected for further evaluation, therefore an updated draft tenant manual is not included in this FEIR.
1	14	MassDEP NERO	MASSDEP Recommends that the FEIR address the following measures: The proponent shall improve proposed bicycle parking access from Dorchester Avenue by providing long term bicycle accommodations as appropriate for project tenants as well as rail and bus commuters. Bicycle parking should be as proposed, secure, convenient, weather protected, and should also be sufficient to meet existing and expected future demand; The proponent shall work with BTD and Boston Bike officials to design, support, and fund as	FEIR Section 3.9.9, Bicycle Parking, provides this information. Details on the bicycle parking element of the project will be refined throughout the engineering design phase of the project. For example, the approximate size and location of proposed bicycle parking and curbside space allocation will be determined as the designs for the headhouse and Dorchester Avenue are finalized. As part of the design approvals for Dorchester Avenue, the location and size of any new Hubway stations would be vetted with the City of Boston. Similarly, MassDOT will identify elements of the

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			necessary, enhanced short term bicycle parking near building entrances as well as off-site bicycle infrastructure to improve access to the project site. Such bicycle accommodations shall employ MassDOT Design Guidelines or engineering judgment, as appropriate.	Construction Management Plan to minimize disruption to transit users, pedestrians, bicyclists, and drivers in the area throughout construction.
1	15	MassDEP NERO	The DEIR commits to compliance with the Massachusetts Anti-Idling regulation (310 CMR 7.11) which prohibits motor vehicles from idling their engines more than five minutes. In addition, the State's Low Sulfur Diesel standards (310 CMR 7.05) must be met. Furthermore, all construction equipment would be required to comply with 310 CMR 7.11 (I)(b) which requires that engines idle for no more than five minutes.	As discussed in DEIR Section 6.4.2, Emissions Control Plan, MassDOT will require that the State's Low Sulfur Diesel standards (310 CMR 7.05) will be met for all diesel-powered equipment accessing the sites. As stated in the DEIR, MassDOT will require that all construction equipment will be required to comply with 310 CMR 7.11 (I)(b) which requires that engines idle for no more than five minutes.
2	1	City of Boston	The [2000 Acts of the Massachusetts General Court] only states that Chapter 91 licensing is not required for the construction of structures on air rights over an intermodal transportation center, and makes no reference to Landlocked Tidelands. Greater clarity must be provided on the DEIR interpretation as it could have implications regarding the project Public Benefit Determination and MHP Amendment.	The Preferred Alternative is in compliance with Chapter 91 regulations and therefore does not require an amendment to the MHP.
2	2	City of Boston	Water transit should be included as a component of any transit and multi modal analysis.	FEIR Section 3.9.11, Water Transportation, addresses this issue.
2	3	City of Boston	We strongly urge that an analysis of an alternative design locating	Comment noted.

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			the station headhouse at the corner of Summer Street and Dorchester Avenue be incorporated into the final environmental analysis.	
2	4	City of Boston	Due to the complexities of air-rights development, it is crucial that the new tracks and platforms incorporate as many structural support elements as possible to ensure the success of future development.	Comment noted.
2	5	City of Boston	[MassDOT] should consider any track improvements to accommodate DMU service for the Fairmount Line and for the "Track 61" corridor.	The Commonwealth of Massachusetts does not currently have formal plans to implement new rail technology on the MBTA's commuter rail system. However, should the Commonwealth contemplate implementing this type of technology into the system in the future, the SSX project would not preclude these services and would be compatible with the use of new technologies within the expanded terminal area.
2	6	City of Boston	MassDOT's Boston Harbor Flood Risk Model should be utilized to better assess the vulnerability of the site, future development and transportation infrastructure to inundation and to evaluate the most effective adaptive measures.	FEIR Section 3.10.1, Vulnerability Assessment Comparison, incorporates the Boston Harbor Flood Risk Model into the sea level rise impact analysis.
2	7	City of Boston	The proponent should also coordinate with the New York City Metropolitan Transportation Authority and review applicable storm resilient design and operational measures they have implement since hurricane Sandy in 2012.	MassDOT will continue to draw from the experience of numerous past projects in the development of the SSX project.
2	8	City of Boston	A range of well-established current extreme weather standards and risk management	FEIR Section 3.10, Climate Change, discusses some of the extreme weather standards that will guide the

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			policies should be in place and considered in the design [of the new station].	design. Further policies will be developed as the design advances.
2	9	City of Boston	We ask that the design account for projected sea level rise and storm surge and recommends a design that provides as much barrier to the train tracks from the waters' edge as possible.	FEIR Section 3.10, Climate Change, addresses sea level rise and storm surge.
2	10	City of Boston	The design should consider emerging/ alternative technologies to reduce heat and flood risks as well as green landscaping along the waterfront edge and surrounding the site in its sidewalks and landscaping. A resilient plan of design for the sea-wall abutting this project should also be discussed as part of long-term resilience plans.	FEIR Sections 3.10.2 through 3.10.5 discuss opportunities to mitigate the risks associated with climate change.
2	11	City of Boston	The site should be planned for considering an evacuation scenario, taking into account customer expectations and how the building layout will aid this process.	FEIR Section 2.1.1, Update on South Station Headhouse Design, discusses the safety parameters guiding the layout of the station.
2	12	City of Boston	The building should be designed to enable greater asset management, communications, technical support for operations, planning and delivering maintenance, and delivery of renewals. This plan for the site should address: large-scale temporary absence of staff, permanent or long-term loss of staff, denial of site, loss of mains electricity, disruption of transport, loss of mains water and sewerage, loss of availability of oil and fuel, and loss of fixed line/mobile communications.	Comment noted.

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2	13	City of Boston	We request that MassDOT consider opening [Dorchester Avenue] for at least pedestrian and bicycle access as soon as possible following the relocation of the USPS.	Comment noted.
2	14	City of Boston	We are requesting that MassDOT fund the full design process for [a new pedestrian bridge over the Fort Point Channel], a crucial link, as a part of their mitigation package.	Under Chapter 91, as a nonwater-dependent infrastructure facility the project is exempt from the regulatory standards at 310 CMR 9.51 (Conservation of Capacity for Water-Dependent Use), 310 CMR 9.52 (Utilization of Shoreline for Water-Dependent Purposes), and 310 CMR 9.53 (Activation of Commonwealth Tidelands for Public Use). Because joint development is no longer included in the project, additional public benefits related to waterfront access are not required. An updated discussion regarding the project's compliance with the Public Benefit Determination criteria is included in Section 3.5.3 of the FEIR.
2	15	City of Boston	The MassDOT team has worked collaboratively with the City in developing curbside operational improvements to Atlantic Avenue. We are requesting that these low cost improvements be done as soon as possible by MassDOT as they would have immediate benefits to the current accessibility of South Station.	Comment noted.
2	16	City of Boston	The seven intersection improvements committed to for the "transportation only" alternative need to be implemented prior to the start of construction for the expansion work.	The sequencing of mitigation will be formalized as part of the CMP for the project.

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2	17	City of Boston	We ask that a premier mobility-hub complete with a state of the art bicycle cage, electric vehicle charging, bicycle/car-sharing, transit/shuttle link arrival/departure time options be included in the design in prominent locations for efficient transfer and mobility choice.	Comment noted.
2	18	City of Boston	We ask that MassDOT continue to work with the city to both reexamine previously evaluated sites as well as consider other new locations for south side midday layover.	During the layover alternatives analysis, MassDOT, in coordination with the City, identified any reasonable site that satisfied the evaluation criteria necessary to adequately support railroad operations at South Station. From this detailed evaluation, Beacon Park Yard, Widett Circle, and expanded Readville – Yard 2 sites were selected as preferred locations for south side midday layover facilities. Beacon Park Yard is being evaluated as part of the I-90 Allston Interchange project. MassDOT and the City will continue to discuss what future opportunities are at the Widett Circle site.
2	19	City of Boston	The design approach for Widett site should be refined to allow for longer term development that could be accommodated over the layover facility.	MassDOT understands that the City of Boston is considering Widett Circle as a potential location for future air-rights development. This would require decking over any future layover yard in order to provide a ground plane on which to build. The proposed design of the Widett Circle layover facility can accommodate and does not preclude future air rights development opportunities, which are outside the scope of this project. As any City efforts advance, MassDOT will continue to coordinate with the City to help realize a future development vision for Widett Circle.

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3	1	Massachusetts Historical Commission	The MHC looks forward to receipt of additional information, including the Final Environmental Impact Report (FEIR) that should contain scaled existing and proposed conditions project plans for the preferred alternative, and to the Federal Railroad Administration's (FRA) determinations of effects for the preferred project alternative in compliance with Section 106 of the National Historic Preservation Act (36 CFR 800).	FEIR Chapter 1, Introduction and Project Summary, includes project plans. Section 3.14.2, Preliminary Determinations of Effect, provides a preliminary determination of effect, developed by MassDOT to assist in consultation with MHC in accordance with State Register Review procedures. FEIR Section 1.5.2, Update on the Section 106 Review Process, discusses the Section 106/NEPA review process.
3	2	Massachusetts Historical Commission	Proposed conceptual designs for new construction and/or modification to the South Station Head House should be submitted to the MHC for review and comment as they are developed.	FEIR Chapter 1, Introduction and Project Summary, includes conceptual design plans. Project plans will be submitted to the MHC at the 30% and 60% design phases for review, to confirm the design is consistent with established design principles and historic preservation standards for new construction.
3	3	Massachusetts Historical Commission	The FEIR should include a matrix of effects for National Register-Listed or National Register-eligible historic architectural resources within the preferred alternative area of potential effect.	FEIR Section 3.14.2, Preliminary Determinations of Effect, includes a matrix of effects for National Register-listed and eligible historic properties.
4	1	Boston Water and Sewer Commission	The MassDOT is responsible for assessing whether the existing water and sewer lines have adequate capacity to serve the proposed South Station site for whichever development scenario is selected.	MassDOT will continue coordination with BWSC to obtain all existing system information that is available to assess the existing condition and determine the impact of the project on the sewer system.
4	2	Boston Water and Sewer Commission	MassDOT should investigate the development of a drainage system dedicated for the South Station site. This dedicated system could provide the project with a system capable of withstanding the higher water	MassDOT will continue coordination with BWSC to obtain all existing system information that is available to assess the existing condition and determine the impact of the project on the sewer system.

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			levels in Fort Point Channel anticipated in the future.	
4	3	Boston Water and Sewer Commission	The Commission will require MassDOT to participate in the 4 to 1 infiltration reduction program. The proponent will need to commit to participating in this program 90 days before the water service for the project is activated.	MassDOT will continue coordination with BWSC as the design process moves forward.
4	4	Boston Water and Sewer Commission	The Commission's Dorchester Brook Conduit abuts this area and provides the means for stormwater to discharge into Fort Point Channel at BOS 070. The proponent will need to contact the Commission to determine how the site can be connected to this conduit.	MassDOT has requested Dorchester Brook information from BWSC on November 20, 2015 and will continue to investigate connections to this conduit.
4	5	Boston Water and Sewer Commission	Depending upon the Standard Industrial Classification (SIC) Code assigned to the activity on this site, MassDOT may be required to submit a Notice of Intent and a Stormwater Pollution Prevention Plan to the U.S. Environmental Protection Agency. The Commission requests to be copied if these documents are submitted for any of the layover areas or the South Station site.	FEIR Section 1.6, Anticipated Permits and Approvals, lists the federal, state, and local agency permits and approvals that are anticipated for the project. MassDOT will submit all required documentation based on the project's future design needs.
4	6	Boston Water and Sewer Commission	The Readville - Yard 2 site is located along the Neponset River. The MassDOT proposes to direct stormwater from this site to the Commission's 54-inch storm drain which discharges to the Neponset River. The Commission requests that the MassDOT develop a storm drainage system that discharges directly to the Neponset River	FEIR Section 3.6.6, Readville – Yard 2 Storm Drain Condition, discusses the drainage pipes at that location. MassDOT met with BWSC on November 17, 2015 to discuss early coordination items including potential outfall locations. Follow-up meetings will occur as the project design progresses.

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			rather than connecting to the existing system.	
5	1	Massachusetts Water Resources Authority	On page 2 of the Appendix 8, Water and Wastewater Technical Report (WWTR), the Proponent reports in the Boston Water & Sewer Commission's (BWSC) assessment that there is adequate capacity in its sewer mains to collect and convey the project's new wastewater flows, which could increase wastewater flow contribution from the site by as much as 453,150 gallons per day (gpd) at the South Station site, an increase of 122% from existing conditions, according to the WWTR. This may be true for dry weather flow conditions, but downstream BWSC and MWRA sewer systems serving South Station and the other project areas can surcharge and overflow during large storms, due to large volumes of stormwater entering combined sewer systems. Any increase in sanitary flow, if not offset with infiltration/inflow ("I/I") or stormwater removal from hydraulically related sewer systems, can be expected to worsen system surcharging and overflows.	FEIR Section 3.7, Water Use and Wastewater, includes a table clarifying the existing, proposed and mitigated wastewater generation at the South Station site.
5	2	Massachusetts Water Resources Authority	It is imperative that the Proponent evaluate how the local sewers to which the project's flows will be connected will perform with the large added flows from the project and the I/I reduction that may occur far afield. Connections to the BWSC sewer pipes should be carefully selected to ensure that any local sewer surcharging is not worsened by the new flows in a	FEIR Section 3.7.2, Impacts to Existing CSOs, addresses this issue.

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			way that causes greater CSO discharges at nearby CSO regulators and outfalls, notwithstanding the removal of extraneous flows elsewhere.	
5	3	Massachusetts Water Resources Authority	If groundwater is encountered during the construction activities, an MWRA Temporary Construction Site Dewatering Discharge Permit will be required pursuant to 360 C.M.R. 10.091-10.094. For assistance in obtaining this permit, both the Proponent and the Contractor (the individual that will conduct the construction) should contact Stephen Buczko, Industrial Coordinator within the TRAC Department at (617) 305-5619.	MassDOT will submit all required documentation based on the project's future design needs.
5	4	Massachusetts Water Resources Authority	Once the South Station Expansion project is completed, and if the Proponent(s) intends to discharge wastewater from a vehicle wash and/or maintenance operation to the sanitary sewer system, an MWRA Sewer Use Discharge Permit will be required. For assistance in obtaining this permit, the Proponent should also contact Stephen Buczko at MWRA. Similar to the Construction Site Dewatering Permit, the Proponent is required to have this Permit prior to discharging wastewater from the vehicle wash process into the sewer system.	No vehicle wash operations are proposed as part of the SSX project.
5	5	Massachusetts Water Resources Authority	The Proponent(s) must also comply with 360 C.M.R. 10.016, if it intends to install gas/oil separator(s) in any of its bus and/or rail facilities to support shops, vehicle storage buildings,	MassDOT will comply with 360 C.M.R. 10.016 as it relates to installation of gas/oil separators.

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			and/or in the vehicle wash building planned for the site.	
5	6	Massachusetts Water Resources Authority	The proponent(s) will need to conform to the regulations of the Board of State Examiners of Plumbers and Gas Fitters, 248 C.M.R. 2.00 (State Plumbing Code), and all other applicable laws.	MassDOT will comply with 248 C.M.R 2.00 and all other applicable laws.
5	7	Massachusetts Water Resources Authority	The installation of proposed gas/oil separator(s) will require MWRA approval and may not be back filled until inspected and approved by the MWRA and the Local Plumbing Inspector. For assistance in obtaining an inspection for each facility the Proponent(s) of each facility should contact Stephen Howard, Source Coordinator, within the Toxic Reduction and Control (TRAC) Department at (617) 305-5675.	MassDOT will contact the TRAC Department to obtain an inspection for each facility prior to obtaining approval from MWRA and the Local Plumbing Inspector.
5	8	Massachusetts Water Resources Authority	MWRA expects to continue to work closely with the Proponent and their consultants to identify where 8 (m) permits will be required.	MassDOT will continue to work with appropriate agencies to identify necessary permits.
6	1	Massachusetts Office of Coastal Zone Management	CZM requests that the proponent consider a range of flooding events over the lifetime of the project and provide information about frequency and the expected severity of inundation on the site.	FEIR Section 3.10.1, Vulnerability Assessment Comparison, incorporates the Boston Harbor Flood Risk Model, which includes a range of flooding events over various periods of time, into the sea level rise impact analysis.
6	2	Massachusetts Office of Coastal Zone Management	CZM requests that the proponent fully consider how adaptable the proposed infrastructure will be in the future, and consider upfront adaptation measures that will be very difficult to implement once the infrastructure is in place.	FEIR Sections 2.1.4, Consistency with Updated Station Design Principles, and 3.10, Climate Change, discuss adaptation strategies.

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6	3	Massachusetts Office of Coastal Zone Management	If the proponent is considering raising the base level of the site, CZM requests that the proponent study the potential flooding impacts to adjacent sites.	At this time, MassDOT is not considering raising the base level of the SSX site.
6	4	Massachusetts Office of Coastal Zone Management	While the DEIR provides a range of potential hazard mitigation/ adaptation strategies, it does not identify which strategies will be employed. The proponent should present a clear strategy for protecting the proposed infrastructure (from flooding) in the long term.	FEIR Section 3.10, Climate Change, discusses adaptation strategies.
6	5	Massachusetts Office of Coastal Zone Management	CZM strongly recommends that the FEIR include an analysis of the preferred alternative using the dynamic model described in the DEIR, the Boston Harbor Flood Risk Model. The analysis should be accompanied by a comprehensive adaptation strategy for the proposed project.	FEIR Section 3.10.1, Vulnerability Assessment Comparison, incorporates the Boston Harbor Flood Risk Model into the sea level rise impact analysis. Section 3.10, Climate Change, discusses the project's adaptation strategy.
6	6	Massachusetts Office of Coastal Zone Management	The proposed project may be subject to CZM federal consistency review, and therefore must be found to be consistent with CZM's enforceable program policies.	FEIR Section 3.5, Chapter 91 Waterways and Tidelands, includes a consistency statement and demonstrates consistency with CZM's enforceable program policies.
7	1	Metropolitan Area Planning Council	While MAPC applauds MassDOT for analyzing the viability of new transit-oriented development, we strongly recommend further exploring creative public/private financing opportunities. Since the SSX project is currently unfunded for construction, it is essential that revenue from private investments be secured to leverage public transportation improvements.	FEIR Section 2.3, Project Cost and Funding, provides a description of MassDOT's approach to project financing.

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7	2	Metropolitan Area Planning Council	To not preclude future private development, MAPC recommends that structural foundations be included as part of the overall station and track design regardless of what alternative is selected.	While there are currently no formal plans to include private development as part of this project, the station and track will be designed so as not to preclude future private development.
7	3	Metropolitan Area Planning Council	MAPC respectfully requests that the FEIR include an evaluation of the MBTA's plans to advance DMU service in the future and how the SSX project will integrate this service. DMU service is a critical component since this train-type is quieter, more efficient and environmentally-friendly. DMUs also rely less on layover movements than trains currently issued by the MBTA.	The Commonwealth of Massachusetts does not currently have formal plans to implement new rail technology on the MBTA's commuter rail system. However, should the Commonwealth contemplate implementing this type of technology into the system in the future, the SSX project would not preclude these services and would be compatible with the use of new technologies within the expanded terminal area.
7	4	Metropolitan Area Planning Council	There should also be a [post-development traffic] monitoring program if Alternative 1 is selected.	The SSX project only includes transportation improvements and substantially improves non-auto accommodations (transit, pedestrian, bus, and bicycle). Traffic monitoring activity would apply only to construction phases of the project and not to post-development building occupancy milestones as it normally would for a development project.
7	5	Metropolitan Area Planning Council	Performance measures should be clearly defined for public transit, walking, and bicycling as well as roadway efficiency and parking.	The DEIR includes detailed performance measurements and quality-of-service ratings for all modes, except parking, which is not provided in the preferred alternative. Refer to DEIR Appendix 9 technical reports (*Ridership Forecasting Technical Report, Transit Capacity Analysis Technical Report, Pedestrian Circulation Analysis Technical Report*, and *Traffic Analysis Technical Report*).

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7	6	Metropolitan Area Planning Council	MAPC recommends that MassDOT monitor the project bi-annually for a minimum of five years and share their results publically. A scope and schedule of MassDOT's Transportation Monitoring Program should be clearly outlined in the Section 61 findings.	Since the project only includes transportation improvements, traffic monitoring activity would apply only to construction phases of the project and not to post-development building occupancy milestones as it normally would for a development project.
7	7	Metropolitan Area Planning Council	The DEIR states that MassDOT is currently prioritizing the advancement of projects in areas of the Commonwealth currently lacking, or underserved by, rail (particularly the South Coast and Worcester) which can be achieved through the South Station Expansion project. MAPC looks forward to reviewing this prioritized advancement of projects in the FEIR.	Many of those issues will be addressed while working through other planning studies, such as MassDOT's upcoming Rail Plan.
7	8	Metropolitan Area Planning Council	Will the SSX project impact rail freight transportation? If so, this should be addressed in the Final Environmental Impact Report (FEIR).	FEIR Appendix E, *Railroad Operations Analysis Technical Report*, addresses operating windows for existing freight service within the project study area, as it operates today. These operating windows for freight service were not adversely impacted by the modeled future year passenger rail service plans.
7	9	Metropolitan Area Planning Council	MassDOT should continue close and collaborative planning with the U.S. Postal Service on the relocation of the General Mail Facility at 25 Dorchester Avenue.	Comment noted.
7	10	Metropolitan Area Planning Council	In order to ensure the Harborwalk's longevity and the numerous public benefits it offers, the FEIR should explain how the Harborwalk will be maintained following construction.	FEIR Section 3.9.10, Maintenance of Public Realm Infrastructure, provides this information.

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7	11	Metropolitan Area Planning Council	While MAPC is aware that the environmental impacts of a layover facility at Beacon Park Yard will be further evaluated as part of the I-90 Allston Interchange Project...there is a need for continued coordination as both projects advance.	Comment noted.
8	1	Massport	The project team should ensure that the proposed project enhances transit connectivity to the South Boston waterfront. Not only should construction of the project increase capacity for commuter rail service and operations, its design should not preclude the possible implementation of new or emerging transit service concepts that may directly use the rail lines that serve South Station. (Examples of these include new service on the Worcester Line between Allston/Brighton and South Station, connections between Back Bay Station and the South Boston Waterfront, and a connection between the Silver Line Transitway and the western commuter rail tracks along Atlantic Avenue.)	Proposed SSX project improvements to the terminal and layover locations would not preclude future service expansions.
8	2	Massport	The project design should ensure that connections to the Silver Line Transitway and Logan Airport are maintained and improved wherever possible.	The SSX project design would not impact connections between South Station and the Silver Line Transitway and/or Logan Airport.
9	1	Congressman Michael E. Capuano	First, I trust that MassDOT will satisfactorily address all relevant environmental, wetland and historical significance regulations. In particular, I expect there is great potential for significant soil contamination onsite, and I encourage	MassDOT will complete all site activities in accordance with the requirements of the Massachusetts Contingency Plan 310 CMR 40.00.

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			MassDOT to address it appropriately.	
9	2	Congressman Michael E. Capuano	[MassDOT] need[s] to account for future rise in sea level and the impact of a storm surge.	FEIR Section 3.10.1, Vulnerability Assessment Comparison, incorporates the Boston Harbor Flood Risk Model into the sea level rise impact analysis.
9	3	Congressman Michael E. Capuano	I strongly suggest that South Station retain its classic rail station look and feel.	Comment noted.
9	4	Congressman Michael E. Capuano	I am curious as to why only sites in the urban core are being evaluated when surely there are sites outside the City of Boston that would be reasonable locations for layover space.	During the layover alternatives analysis described in DEIR Section 3.6, Layover Facility Site Alternatives Analysis, MassDOT, in coordination with the City, developed a tiered alternatives analysis process, identifying 28 alternatives for Tier 1 screening. Of the 28 candidate sites, 10 locations. that satisfied the evaluation criteria necessary to adequately support railroad operations at South Station advanced to the Tier 2 evaluation. The Tier 3 screening included detailed analysis of four potential sites. One of the siting evaluation criteria included close proximity to South Station in order to minimize conflicts between revenue and non-revenue trains between South Station and the storage yards. From this detailed evaluation, the Widett and expanded Readville – Yard 2 sites were selected as the preferred locations for south side midday layover facilities.
9	5	Congressman Michael E. Capuano	I am curious where the engines and passenger cars will be serviced - does the current South Side Maintenance Facility have the capability, or will one need to be constructed?	The MBTA's south side commuter rail equipment will continue to be serviced at the MBTA's South Side Service and Inspection Facility. Extensive equipment repairs will continue at the MBTA's Commuter Rail Maintenance Facility.

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9	6	Congressman Michael E. Capuano	I feel it is important that during construction, the commuter rail and Amtrak trains continue to run, and impacts on both transit and private vehicle traffic be minimized.	As described in DEIR Chapter 6, rail-related construction activities would be performed in close coordination with the operating railroads, including the MBTA and its commuter rail operator, Amtrak, and CSXT. As part of the final design process, opportunities to minimize train operation disruptions by coordinating and combining rail systems' planned maintenance activities with construction activities will be further investigated. A traffic management plan will also be developed in coordination with the City of Boston to minimize impacts to vehicular traffic.
9	7	Congressman Michael E. Capuano	I strongly suggest that the final design for South Station be done in such a way that a future link to North Station is not precluded.	See response to Comment C.39.
10	1	Representative Sean Garballey	Building plans should adopt LEED Plus green building standards, minimize life-cycle costs by use of energy efficiency and renewable energy, comply with the Boston Redevelopment Authority's Climate Checklist, and adhere to the state's stretch energy code standard.	FEIR Section 3.13.9, Applicable Energy Codes, Standards, and Rating Systems, addresses this issue.
10	2	Representative Sean Garballey	All designs should account for climate change; this includes but is not limited to: increased frequency of flooding, rising sea levels, and more frequent occurrences of extreme weather.	FEIR Section 3.10, Climate Change, addresses these issues.
11	1	Representative Frank I. Smizik	South Station improvements should also reduce both GHG emissions and total energy use in all phases of design and construction. Building plans should adopt LEED Plus green building standards, minimize life-	FEIR Section 3.13.9, Applicable Energy Codes, Standards, and Rating Systems, addresses this issue.

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			cycle costs by use of energy efficiency and renewable energy, comply with the Boston Redevelopment Authority's Climate Checklist, and adhere to the state's stretch energy code standard.	
11	2	Representative Frank I. Smizik	All designs should account for climate change; this includes but is not limited to: increased frequency of flooding, rising sea levels, and more frequent occurrences of extreme weather.	FEIR Section 3.10, Climate Change, discusses the analysis regarding sea level rise, flooding, and potential inundation.
12	1	Senator B. Tarr	I am aware of many compelling reasons to support connecting North Station and South Station via a Rail Link….I believe it would be imprudent to initiate other actions that would preclude this goal from being accomplished.	See response to Comment C.39.
13	1	Boston University	[The following] issues need to be addressed in the South Station Expansion Final Environmental Impact Report (FEIR) rather than the Allston 1-90 Interchange MEPA filings lest they "fall between the cracks." • The DEIR has failed to fully examine alternative locations or adequately explain why Beacon Yards has emerged as "the preferred" location with the least environmental impact. • The proposed maintenance facility uses of BPY seem to be vastly understated in the DEIR and are presented differently in the Allston I-90 Interchange Environmental Notification Form (ENF). The impact such a significant project and "industrial" use of the property	As described in the SSX project DEIR, the use of BPY was identified as a preferred alternative but is subject to environmental review as part of the I-90 Allston Interchange project. The I-90 Allston Interchange project is further refining the concept design and environmental evaluation of BPY, which is occurring concurrently with the SSX project. A DEIR for that project is anticipated to be filed in spring 2017. The SSX project will continue to evaluate the use of Widett Circle and expanded Readville –Yard 2 alternative sites for additional layover capacity needs to support the expansion of the terminal area.

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			may have on Boston University and the adjoining neighborhoods.	
14	1	Harvard University	Harvard recommends that the Secretary's Certificate for the South Station Expansion project FEIR require MassDOT to provide the missing data and related analysis regarding future MBTA service needs (whether through existing rail lines or new lines) and future layup/layover needs.	As described in the DEIR, for the purpose of planning, projected future MBTA service levels were developed for the 2035 horizon year on the south side to support the analysis of the expansion of South Station and its future layover needs. The development of the 2035 operating plan and the operations analysis are described in FEIR Appendix E, *Railroad Operations Analysis Technical Report*.
14	2	Harvard University	Harvard recommends that the Secretary's Certificate on the FEIR require MassDOT to report on the status of Beacon Park Yard as MassDOT progresses through its evaluation of the 1-90 Allston Interchange project.	See response to Comment 13.1.
15	1	The Boston Harbor Association	We ask that the Secretary's Certificate have the proponent look at what transportation and circulation improvements can be made even under the "No Build" baseline alternative.	Comment noted.
15	2	The Boston Harbor Association	Incorporate other elements of the Watersheet Activation Plan, including the potential development of a pedestrian bridge crossing the Channel to enhance pedestrian access between South Station and the areas to the east of the Channel (page 50, BRA Fort Point Channel Watersheet Activation Plan), as well as possible activities on the watersheet, such as a "moveable art barge", water trail/interpretive trail, and "floating island" on the watersheet closest to the U.S.	Under Chapter 91, as a nonwater-dependent infrastructure facility the project is exempt from the regulatory standards at 310 CMR 9.51 (Conservation of Capacity for Water-Dependent Use), 310 CMR 9.52 (Utilization of Shoreline for Water-Dependent Purposes), and 310 CMR 9.53 (Activation of Commonwealth Tidelands for Public Use). Because joint development is no longer included in the project, additional public benefits related to waterfront access are not required. An updated discussion regarding the project's compliance with the Public Benefit Determination criteria is

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			Postal Service (page 27 of BRA Watersheet Activation Plan).	included in Section 3.5.3 of the FEIR.
15	3	The Boston Harbor Association	Examine the possibility of water transportation to the South Station area.	FEIR Section 3.9.11, Water Transportation, addresses this issue.
15	4	The Boston Harbor Association	These and other measures in "Table 5.2- Risks and Mitigation Strategies Associated with Hurricane Surge and Sea Level Rise" of the Draft EIR are excellent initial measures, and we look forward to additional details in the Final Environmental Impact Report.	FEIR Section 3.10, Climate Change, discusses the project's adaptation strategy.
16	1	Association for Public Transportation	It is distinctly possible that proposed development at South Station and the South Postal Annex will make constructing the NSRL impossible.	See response to Comment C.39.
17	1	New Boston Food Market Development Corporation	Although as it is stated in the DEIR, "it is assumed that these affected businesses would be relocated within the immediate project vicinity in the Boston area, and that no long-term loss of employment would occur," we have no understanding of how, where and when our businesses would be relocated and affected. And, as stated above, we know of no other location in the City of Boston where all of our transportation and space needs could possibly be met.	FEIR Section 3.3.4, MassDOT's Legal and Regulatory Obligations, explains how the project will comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, 42 USC 4601, and related laws and regulations. Section 1.5.1, Update on Public Outreach Activities, describes outreach to business owners at Widett Circle.
17	2	New Boston Food Market Development Corporation	Engage in an active dialogue with our organization if Widett Circle is indeed being considered seriously as one of the layover sites.	FEIR Section 1.5.1, Update on Public Outreach Activities, describes outreach to business owners at Widett Circle.

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18	0	Greater Boston Chamber of Commerce	No applicable comments relative to the scope of the study (letter of support).	Comment noted.
19	1	Medical Academic and Scientific Community Organization (MASCO)	We request that the Final Environmental Impact Report (FEIR) evaluate the potential impact that the added non-revenue trips between South Station and the planned layover facility at Beacon Park Yard will have on commuter rail service along the Worcester/Framingham Line and identify ways to mitigate any impacts.	FEIR Appendix E, *Railroad Operations Analysis Technical Report*, contains information about the operations analysis. This analysis includes both revenue and non-revenue train trips and their impacts to commuter rail service along the Framingham/Worcester Line and other south side lines.
20	1	Massachusetts Chapter of the Sierra Club	Trains [in layover yards] would shower yet more fumes and particulates on the city's residents.	As stated in the DEIR, locomotives accessing the layover facilities (as well as South Station) must be in compliance with the U.S. EPA Line Haul Locomotives Tier 4 Exhaust Emission Standards. The Tier 4 standards are the most restrictive locomotive standards that the U.S. EPA has in place and apply to all locomotives built or remanufactured in the year 2015 and beyond. The fumes and particulates emitted by these locomotives will be further reduced as all locomotives accessing the layover facilities for more than one hour will be connected to shore power (electrical plug-in units) during their stay at the facilities.
20	2	Massachusetts Chapter of the Sierra Club	Abutters to any layover yard would also be subjected to the constant noise of the locomotives, especially from overnight idling during the winter months.	The layover facilities at Widett Circle and Readville – Yard 2 will be used for midday layover, not overnight layover. FEIR Section 3.12.3, Potential Mitigation Measures, details the proposed noise barrier for Readville – Yard 2. In addition, the train locomotives will be plugged into shore power to minimize the amount of time that the

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				locomotives will idle at these layover facilities.
20	3	Massachusetts Chapter of the Sierra Club	The DEIR also glosses over the operational issues of a large terminal with many stub-end tracks and limited space for an adequate "throat" of tracks and switches connecting the platforms with the approach tracks from the west and south, and with the Southampton Street yards.	FEIR Section 3.8.2, Terminal Track Configuration Alternatives Analysis, discusses the future operations and interlocking designs.
20	4	Massachusetts Chapter of the Sierra Club	Incredibly, [the DEIR] seems to believe that this project will have a negligible-or even slightly beneficial-effect upon the air quality in and around South Station.	The Air Quality impacts presented in the DEIR were prepared using the most recently approved U.S. EPA analytical tools and the most recent planning assumptions. As stated in the DEIR, Chapter 4.12.2, for the year 2025, project-related annual emissions of CO, VOC, NOx, PM_{10}, and $PM_{2.5}$ for Alternative 1 generally increase by less than 2% when compared to the area-wide emissions for the 2025 No Build Alternative. Annual project-related SO_2 emissions in 2025 decrease by about 2%. For 2035, project-related annual emissions of CO, VOC, NOx, PM_{10}, and $PM_{2.5}$ for Alternative 1 also increase by about 2% when compared to the area-wide emissions for the 2035 No Build Alternative. Annual SO_2 emissions in 2035 also decrease by about 2%. Based on this analysis, the small amount of emissions will not cause or contribute to exceedances of any air quality standards.
21	1	Don't Dump on Us Task Force	We ask that you include us in all discussions and provide ample process and information for us to offer informed input on this project.	FEIR Section 1.5.1, Update on Public Outreach Activities, describes outreach to business owners at Widett Circle.

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22	1	Allston Group	The space for the concourse will be quite limited and that congestion at the ends of platforms will be a regular occurrence. We request that the FEIR more completely lay out what will be done to remove some of these difficulties. We also request that the FEIR show which of the concourse and platform mitigation efforts might be incorporated into the projected pedestrian movements to and from the proposed air rights projects above the concourse and platform spaces.	FEIR Section 2.1.1, Update on South Station Headhouse Design, addresses pedestrian circulation.
22	2	Allston Group	We would add that a fourth site - the existing, large and well-equipped Boston Engine Terminal in Somerville - be included in these considerations.	MBTA's Commuter Rail Maintenance Facility site (formerly referred to as the Boston Engine Terminal) was evaluated during the initial layover facility alternatives analysis conducted for the project's Environmental Notification Form (ENF). It was dismissed for the following reasons: 1) distance and travel time for midday layover operations would be substantial; 2) a reverse move would be required to access Beacon Park Yard; and 3) major infrastructure improvements would be required to the MBTA Fitchburg Route and Grand Junction Running Track.
22	3	Allston Group	We request that the Beacon Park Yard alternative be retained in the SSX FEIR analysis until the full array of layover needs can be evaluated, including a combination of the three sites.	See response to Comment 13.1.
22	4	Allston Group	Further analysis should closely examine the ways in which operations would be affected if fewer tracks for layover were	While the DEIR contemplated the use of BPY for a maximum limit of 30 trainsets for midday layover, the I-90 Allston Interchange project is currently analyzing the program for

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			available at the Beacon Park Yards site.	midday layover functions at this facility, including associated impacts to railroad operations.
23	1	Allston Group	Serious issues of segmentation and environmental justice exist in the planning and review of the South Station Expansion, I-90 Interchange Improvement Project, and Beacon Park Commuter Rail Layover and Maintenance Yard.	The FEIR has been prepared and filed in accordance with 301 CMR 11.00.
23	2	Allston Group	The vibration, noise, air quality, and Environmental Justice impacts at Beacon Park Yard in Allston are severe.	See response to Comment 13.1.
24	1	Fidelity Real Estate Company	A study must be completed to determine the possible construction vibration and noise impact to 245 Summer Street, and more specifically to our critical computer systems. We ask that the project investigate vibration and noise for all alternatives and detail the impacts to 245 Summer Street.	FEIR Section 3.12, Noise and Vibration, describes potential project impacts. Vibration measurements were obtained in August 2013 both inside the basement area of 245 Summer Street near the sensitive computer systems and outside adjacent to the building during train activity at South Station. A copy of this vibration assessment report is available to Fidelity Real Estate Company.
24	2	Fidelity Real Estate Company	We ask that the project investigate the impact that a proposed noise wall would have on the occupants and exterior landscape of 245 Summer Street both not only from a noise perspective but also include what impact the wall would have on natural light.	The proposed 18-foot high noise barrier would be significantly lower than the existing 30-40 foot tall USPS building. In addition, the noise barrier would be set back from Dorchester Avenue located close to the easternmost track. As a result, the proposed noise barrier would have significantly less impact on the occupants and the exterior landscape of 245 Summer Street than the existing USPS facility.

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24	3	Fidelity Real Estate Company	The expansion and opening of Dorchester Avenue will impact the operations of the loading dock at 245 Summer Street....We ask the project to provide clarification and inform us how our existing delivery requirements will be met without impacting the surrounding environment.	The operations of the loading dock at 245 Summer Street will be carefully reviewed as part of the engineering design of Dorchester Avenue. Detailed truck turning diagrams illustrating maneuvering operations to and from the loading dock will be prepared.
24	4	Fidelity Real Estate Company	We have critical infrastructure below grade in 245 Summer Street which is sensitive to moisture. Therefore, we ask the project to provide us detail on the risks associated with changes to the surrounding landscape, [and what impacts the proposed changes will have to ground or salt water].	FEIR Section 3.6, Water Quality and Stormwater, and Appendix A, *Stormwater Analysis Technical Report,* detail the location and selection of stormwater BMPs on site. The proposed surface runoff quantities in post-development are less than that in pre-development. The project will not be adding any additional water to the site.
25	1	James G. Grant Co., LLC	The DEIR states that no long term loss of employment will occur as the result of taking 0.7 acres from Grant, necessary to construct the Readville- Yard 2 Layover. This statement is unsupported and inaccurate, however, and should be more rigorously addressed. Taking of 0.7 acres of Grant's property - nearly 10% of its property - will force Grant to greatly downscale its operations or cease operations altogether.	FEIR Section 3.3.4, MassDOT's Legal and Regulatory Obligations, explains how the project will comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, 42 USC 4601, and related laws and regulations.
25	2	James G. Grant Co., LLC	The Readville - Yard 2 layover site can accommodate the fewest eight-car trainsets of all of the proposed layover sites - only eighteen. This size may be insufficient for long term planning and growth, and should be further explored.	As stated in DEIR Section 3.6, Layover Facility Site Alternatives Analysis, MassDOT, in coordination with the City, identified any reasonable midday layover site that satisfied the evaluation criteria necessary to adequately support railroad operations at South Station. One of the siting evaluation criteria included favorable topography, shape

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				and size. From this detailed evaluation, the Widett Circle and expanded Readville – Yard 2 sites were selected as the preferred locations for south side midday layover facilities.
25	3	James G. Grant Co., LLC	The relationship between the small size of the proposed yard and its impact on the surrounding community should be fully studied, particularly because the proposed Readville - Yard 2 layover site is located in close proximity to a single-family residential district zone.	FEIR Chapter 3, Environmental Analyses, discusses potential impacts from the proposed expansion of the Readville – Yard 2 layover facility.
25	4	James G. Grant Co., LLC	Further study should be conducted at this time in order to obtain necessary data to define the extensive wetlands permitting that may be required to develop a layover at this site.	FEIR Section 3.4, Wetlands, discusses the location and type of all jurisdictional wetlands.
25	5	James G. Grant Co., LLC	The current conditions of those drainage pipes [at Readville – Yard 2] are unknown, and more evaluation is needed in order to determine necessary design issues. These drainage issues should be fully addressed.	FEIR Section 3.6.6, Readville – Yard 2 Storm Drain Condition, addresses this issue.
25	6	James G. Grant Co., LLC	The age, condition, and size of several water pipes and sewer pipes servicing Readville - Yard 2 are unknown. Design elements and mitigation factors will depend upon the conditions of these services, and should be studied further at this time.	FEIR Section 3.6.6, Readville – Yard 2 Storm Drain Condition, addresses this issue.
25	7	James G. Grant Co., LLC	With respect to the open RTN, the impacts of these environmental issues have not been fully addressed by the DEIR.	FEIR Section 3.15, Site Contamination and Hazardous Materials, provides this information.

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25	8	James G. Grant Co., LLC	The proposed site lies within the Neponset River Riverfront Protection Overlay District. Additional design elements will be required to construct the layover at this proposed location in order to comply with the demands of the overlay district.	MBTA services, equipment, and facilities are exempt from local zoning regulations. However, measures will be taken to mitigate environmental impacts to the Neponset River. The addition of new impervious surfaces will be minimized to the greatest extent practicable.
25	9	James G. Grant Co., LLC	Overall, the DEIR's analysis of environmental issues with respect to the proposed Readville - Yard 2 layover site is not sufficiently comprehensive, and should be further addressed.	As stated in the December 31, 2014 Secretary's Certificate, the DEIR adequately and properly complied with MEPA and its implementing regulations, and required preparation of an FEIR with a limited scope for the SSX project. This FEIR provides the results of the additional environmental analyses conducted since the DEIR.
26	1	Related Beal	We need to focus on connecting the North and South stations to resolve the growing congestion by the fact that North and South stations are not connected by rail link.	See response to Comment C.39.
27	1	Brad Bellows Architects	Linking North and South Stations will not only resolve all of the capacity constraints at both stations far into the future, while reducing the footprint of rail uses in the center city, it will also knit together our region as no other transportation investment can.	See response to Comment C.39.
27	2	Brad Bellows Architects	The SSX's air rights developments are located directly above major parts of the NSRL Atlantic Avenue and Dorchester Avenue alignments. Absent careful structural coordination, these structures may well be nails in the coffin for rail integration in Massachusetts.	See response to Comment C.39.

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27	3	Brad Bellows Architects	A proper cost / benefit analysis of a North South Rail Link needs to be completed.	See response to Comment C.39.
28	0	Adam Castiglioni	No applicable comments relative to the scope of the study (letter of support).	Comment noted.
29	1	Frank DeMasi	The south station interlocking and layover yard improvements also provide an opportunity to improve port rail access and this need should be included in the DEIR.	FEIR Section 3.8.2, Terminal Track Configuration Alternatives Analysis, discusses the future operations and interlocking designs, while Section 3.8.4, Preferred Layover Facility Operations Assessment, discusses layover yard improvements. Access to the ports was not evaluated as part of this study.
29	2	Frank DeMasi	The alternate site for the Postal Annex needs to be considered in the DEIR. There needs to be consideration for the impact to the port if the annex is to be moved into a designated port area or property within the seaport area. Massport needs as much lay-down area as it can get or retain for its planned expansion, for both trucks, container storage, and in the future rail cars. If the Postal annex is to be moved into the DPA, consideration needs to be made on its impact on related port operations.	Comment noted.
30	1	Honorable Michael S. Dukakis	A number of us tried to point out at the outset of this process that it was essential that the any environmental review of the proposed station expansion include an analysis of the North-South Rail Link as an alternative to station expansion which would solve the congestion problem at South Station without any need for station expansion.	See response to Comment C.39.

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30	2	Honorable Michael S. Dukakis	Through service obviates the need for midday layup/layover facilities. There is no recognition of that fact in the DEIR. Moreover, by suggesting that such a facility might be located in the Beacon Park Yard, the report ignores the adverse impact that any such facility would have on plans for high speed rail connecting Boston, Worcester, Springfield, Hartford and New York-- a key part of Governor Patrick's proposed rail plan for the Commonwealth and New England.	See response to Comment C.39.
31	1	Steve Hollinger	I support a number of objectives of the S. Station expansion project as described in the DEIR. Please include me on the list of official commenters.	Mr. Hollinger has been added to the list of DEIR commenters.
32	1	Acton Chrysler Dodge Jeep Ram	In my view the entire northeast transportation corridor would sustain broader benefits from connecting Boston's rail station system. I believe that this is the time to fully vet every option and that the NSRL merits a full review.	See response to Comment C.39.
33	1	Ned Imbrie	The plan, no matter which alternative, should include noise abatement along Atlantic Avenue, particularly near and south of the bus station entrance.	Consistent with federal requirements for noise mitigation, the project is not required to mitigate existing noise levels. However, the results of the noise modeling analysis indicate that the cumulative 24-hour (Ldn) noise levels would actually decrease along Atlantic Avenue due to the increase in the number of tracks at South Station (from 13 to 20) resulting in a redistribution of the trains away from Atlantic Avenue.
34	1	Stephen H. Kaiser	The Final EIR should identify the key critical capacity limitations as they exist today, and as they	FEIR Appendix E, *Rail Operations Analysis Technical Report*, includes a detailed discussion of existing and

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			might continue in the future with the new designs in place.	potential future rail operations. The capacity limitations as they exist today consist of a combination of several factors, including the configuration of platform tracks at South Station, the location and availability of rail layover space, and the configuration and rail operations through the interlockings.
34	2	Stephen H. Kaiser	One useful effort would be to look at the original South Station track plan of 1899 when close to 20 tracks existed. Was there an interlocking problem then, or did the old-timers have it solved?	FEIR Section 3.8.2, Terminal Track Configuration Alternatives Analysis, discusses the future operations and interlocking designs.
34	3	Stephen H. Kaiser	Capacity and operations issues should be considered for both normal or average day operations, as well as response to severe disruptions, such as a blockage of the Tower 1 interlocking tracks. What are worst case scenarios which MassDOT hopes to address?	FEIR Appendix E, *Rail Operations Analysis Technical Report*, includes a detailed discussion of existing and potential future rail operations. The operations analysis incorporates randomized delays to the schedules in each simulation run, resulting in delay and on time performance statistics. These statistics are then averaged to determine the impacts to South Station and Tower 1 operations on a typical or average day of operations.
34	4	Stephen H. Kaiser	Will the use of more bi-level cars result in delays loading and unloading, as waiting passengers crowd the platforms near the two entrance doors to each car?	The use of more bi-level cars would be expected to result in longer dwell times as compared to the use of single level cars. The operations analysis conducted for the SSX project included simulated dwell times developed from existing operations data. At South Station, the 2035 horizon year operations analysis included a minimum turn time of ten minutes for each train, with a preferred scheduled turn time of 15 minutes or more where possible. Hence, the use of more bi-level cars is not expected to result in additional delays to operations at

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				South Station. Additional information on the operations analysis is included in FEIR Appendix E, *Rail Operations Analysis Technical Report*.
34	5	Stephen H. Kaiser	Will future Amtrak and commuter rail passengers seeking to continue their trip encounter peak hour congestion and delays on the Red and Silver Lines?	Appendix F, Transportation Documentation, demonstrates that the project would not result in crowding impacts to the Red Line and/or Silver Line that would exceed the MBTA's *Service Delivery Policy* maximum load more than impacts anticipated in the No Build Alternative.
34	6	Stephen H. Kaiser	Both the EIR text and appendices need a closer comparison of existing and future conditions at each key [platform] congestion or trouble spot.	The methodology and results of an updated transit capacity analysis within transit vehicles is presented in FEIR Appendix F, *Transportation Documentation.* For this analysis, the future No-Build year (2035) scenario, representing the future baseline conditions without the expansion of South Station, was compared to the future Build year (2035) conditions, with the expansion of South Station in place. Additionally, a discussion of the updated South Station design and passenger circulation is provided in Section 2.1, South Station Headhouse Design Updates.
34	7	Stephen H. Kaiser	The data presented on page 2-6 suggest that there would be an increase in Amtrak daily train movements from 72 to 138, or an increase of 92% over the next 20 years. However, the increase in Amtrak ridership would be only 37%. Are these numbers correct and do they reflect a proper planning for efficient passenger handling?	The comparison of train increases to ridership projections is not a direct one-to-one relationship; meaning for every seat on a train added, the ridership count does not increase by one. Ridership projections are a function, in part, of the markets being served, the capacities of trains that will be provided to these markets, and other functions such as parking constraints. From the *Transit Cooperative Research Program's Research Results Digest 4*: "External

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				forces—population change, development trends, regional economic conditions, decisions of specific firms, other public policy decisions—frequently have a greater effect on ridership than system and service design initiatives." Additionally, ridership can be attributed only to the number of revenue train movements, not the total of all trains inclusive of both revenue and non-revenue moves. These additional revenue trains in the future Build year include expanded Acela service between Boston and New York City/points south via the NEC, and proposed New England Regional services that could operate between Boston and Springfield with shorter trainsets to better match the demands in this market area. The anticipated growth in Amtrak daily train movements, revenue trains, and the comparison to ridership is summarized in Table 5-4, Amtrak Growth Summary.
34	8	Stephen H. Kaiser	The daily MBTA commuter trains would increase from 377 moves to 416, an increase of 13%. The percentage increase in commuter rail riders is almost the same as Amtrak -- 33%. The basic results warrant further detailed explanation.	The comparison of train increases to ridership projections is not a direct one-to-one relationship; meaning for every seat on a train added, the ridership count does not increase by one. Ridership projections are a function, in part, of the markets being served, the capacities of trains that will be provided to these markets, and other functions such as parking constraints. From the *Transit Cooperative Research Program's Research Results Digest 4*: "External forces—population change, development trends, regional economic conditions, decisions of specific firms, other public policy decisions—frequently have a greater effect on ridership than system and

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				service design initiatives." Additionally, ridership can be attributed only to the number of revenue train movements, not the total of all trains inclusive of both revenue and non-revenue moves. A substantial portion of the projected increase in MBTA ridership is attributable to the proposed new service to Fall River/New Bedford. Increased service to existing commuter rail markets, including additional peak period, peak direction trains on the Needham, Franklin, Providence, and Framingham/Worcester commuter rail lines also contribute to ridership increases. In the 2035 Build Alternative, for purposes of planning, commuter rail trainset capacity to all markets is assumed to substantially increase due to the operation of longer, 8-car trainsets with all bi-level coaches (car seated capacity of 185), for a total trainset capacity of 1,480 passengers. The anticipated growth in MBTA daily train movements, revenue trains, and the comparison to ridership is summarized in Table 5-4, MBTA Growth Summary.
34	9	Stephen H. Kaiser	The volume to capacity ratios are shown for various rail lines. I urge that careful thought should be given to revising all of the numbers.	The methodology and results of an updated transit capacity analysis, including volume to capacity ratios, is presented in FEIR Appendix F, *Transportation Documentation*.
35	1	Kenneth J. Krause	The Final Environmental Impact Report should be required to provide the specific details in all relevant areas of the project that will ensure that the SSX is being planned with the future North-South Rail Link in mind.	See response to Comment C.39.

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36	1	Robert J. La Tremouille	Addition of one or more tracks in the area facing Dorchester Avenue should be seriously considered.	MassDOT has analyzed numerous different alternatives to date and has selected the Preferred Alternative. DEIR Appendix 2, *Track Configuration Alternatives Analysis–Tier 2 Screening Technical Report*, discusses the reason for selecting the 20 track alternatives.
36	2	Robert J. La Tremouille	At minimum, an analysis [of any choke point problem in the entrance to South Station] should be presented.	FEIR Section 3.8.2, Terminal Track Configuration Alternatives Analysis, discusses the future operations and interlocking designs. DEIR Appendix 2, *Track Configuration Alternatives Analysis Report,* discusses the Tower 1 Interlocking and the entrance to South Station.
36	3	Robert J. La Tremouille	Can the expansion project build under tracks 11, 12, and 13 and others for future expansion? Why not include that in the analysis as well?	FEIR Section 3.8.3, Track Layout Capacity and Future Ridership, discusses accommodations for future conditions. MassDOT is not proposing underground expansion as part of this project.
36	4	Robert J. La Tremouille	Why not use underground expansion in the future for parking in the short run as in the bus facility?	MassDOT is not proposing underground expansion as part of this project.
37	1	Katherine Green Meyer	[I support the project if] the North South link possibility is not cut off by this work.	See response to Comment C.39.
37	2	Katherine Green Meyer	[I support the project if] the rail connection to the Port is kept and improved.	The SSX project does not provide rail access to the port.
37	3	Katherine Green Meyer	Also, the rent for retail, etc. should be estimated conservatively. The figures for rent and vacancies for Union Station (D) should be studied.	Joint development is no longer part of the project.
38	1	Gerry Pieri	We must allow space for a 4-track Red Line station (with two platforms) on the second level above tracks 15 through 18 along	Consideration of such a design is not within the scope of the project.

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			including space for a robust interlocking. (Two tracks will not work.)	
38	2	Gerry Pieri	The current storage of train-sets at Readville completely violates environmental and operational goals: • It involves nearly a 9-mile move (twice a day) for each stored train-set – using energy, creating emissions, and creating operational conflicts with revenue trains. • The Readville facility traditionally has been a source of displeasure to – and opposition from -- its neighbors (in what is essentially a residential neighborhood). • The location provides almost no options for crew members who are expected to lay-over at the site.	The proposed expansion of the Readville – Yard 2 layover facility will mitigate the project's environmental impacts to the surrounding area in compliance with the requirements of the state and federal environmental review processes. CTPS provided regional CO_2 emissions data to the SSX project team for each of the modeled alternatives, using the same methodology as for Boston Region MPO's Long Range Transportation Plan's regional air quality conformity determinations. Those data show a decrease in region-wide CO_2 emissions associated with the transportation improvements at South Station. The expanded layover facility will provide support facilities, including accommodations for crew members.
38	3	Gerry Pieri	It is critical that the layout of [the Widett Circle site] provides room for adequate support columns to enable air rights development – even if this means that one or two of the 28 tracks are sacrificed.	MassDOT understands that the City of Boston is considering Widett Circle as a potential location for future air-rights development. This would require decking over any future layover yard in order to provide a ground plane on which to build. The proposed design of the Widett Circle layover facility can accommodate and does not preclude future air rights development opportunities, which are outside the scope of this project. As any City efforts advance, MassDOT will continue to coordinate with the City to help realize a future development vision for Widett Circle.

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38	4	Gerry Pieri	The author conducted detailed analysis of all of the movements (scheduled and "pullback"at South Station as part of the Central Artery / Tunnel ("Big Dig") project. The inescapable conclusion was that station track assignments which minimized cross-over moves could resolve all track-occupancy conflicts during the "Big Dig" – to the extent that a two-track (rather than three-track) temporary bridge crossing over the Fort PointChannel was workable – thereby saving tens of millions of dollars in project costs. The current DEIR should be revisited to possibly revise the proposed interlocking design.	FEIR Section 3.8.2, Terminal Track Configuration Alternatives Analysis, and Appendix D, *Track Configuration Alternatives Analysis - Tier 2 Screening Technical Report*, discusses interlocking design.
38	5	Gerry Pieri	The author strongly endorses the concept of an additional headhouse providing direct access from Dorchester Avenue.	Comment noted.
39	1	James RePass	Building or expanding dead-end rail stations in major cities, when they can be connected, is foolish. No European country would dream of engaging in a project as ill-conceived as this one, in a city where the two major terminals are literally a mile apart, and where connecting them would provide not only the capacity both North and South stations need, but create a new through-service up and down the Eastern Seaboard of New England for both intercity and commuter rail trains, effectively quadrupling the size of the employee/employer pool.	See response to Comment C.39.

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40	1	Joseph Rogers	It is imperative that the A Street parcels are developed within the stated objectives and guidelines of the City of Boston One Hundred Acre Plan.	Development of the A Street parcels is beyond the scope of the project.
41	1	Frederick Salvucci	[Request] greater specificity [on] the intended end state upon project completion, and the compatibility of the intended end state with other MassDOT priorities (see comments 41.2-9)	See response to Comments 41.2-9 below.
41	2	Frederick Salvucci	[Request greater specificity on compatibility with] new DMU service to better serve the Fairmount Branch and the proposal for DMU service from Back Bay to the convention center.	The Commonwealth of Massachusetts does not currently have formal plans to implement new rail technology on the MBTA's commuter rail system. However, should the Commonwealth contemplate implementing this type of technology into the system in the future, the SSX project would not preclude these services and would be compatible with the use of new technologies within the expanded terminal area.
41	3	Frederick Salvucci	[Request greater specificity on compatibility with] the expansion of the Bus Terminal.	FEIR Section 2.1.1, Update on South Station Headhouse Design, discusses access to the existing and expanded Bus Terminal.
41	4	Frederick Salvucci	[Request greater specificity on compatibility with] a Massport South Station to Logan direct shuttle.	Assessing compatibility with a Massport South Station to Logan Direct shuttle is beyond the scope of the project.
41	5	Frederick Salvucci	[Request greater specificity on compatibility with] the pedestrian access to the expanded Bus Terminal.	FEIR Section 2.1.1, Update on South Station Headhouse Design, discusses pedestrian access to the existing and expanded Bus Terminal.
41	6	Frederick Salvucci	[Request greater specificity on compatibility with] the pedestrian flows of the rail and bus patrons through the common commercial service area.	FEIR Section 2.1.1, Update on South Station Headhouse Design, discusses pedestrian flows of rail and bus patrons.

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41	7	Frederick Salvucci	[Request greater specificity on compatibility with] connections to the Red and Silver Lines.	FEIR Section 2.1.1, Update on South Station Headhouse Design, discusses connections to the Red and Silver Lines.
41	8	Frederick Salvucci	[Request greater specificity on] the partial expansion possibilities in the event that the U.S. Post Office continues to not agree with the proposed relocation.	MassDOT does not have plans to expand South Station without the USPS property as part of the SSX project.
41	9	Frederick Salvucci	[Request greater specificity on] the sequence of improvements that will allow the quality and capacity of service to South Station to grow in the near term when, even with the full cooperation of the Post office in relocating, passenger demand will continue to grow, while capacity may diminish because of construction disruption, particularly in the intensively used Back Bay to South Station track and signal area.	Appendix G, *Construction Management Plan*, discusses the sequence of improvements.
41	10	Frederick Salvucci	I have a particular concern that there needs to be much more transparency about the potential to increase capacity in the interlocking. MassDOT has announced a policy of tripling the mode share of transit use statewide, which implies more than tripling of passenger rail capacity to the high growth Seaport Innovation district, which is already overloading. The my [*sic*] auto capacity and causing problems with regional access to Logan. Yet the DEIR shows a 50% increase in track layout in South Station, but only about 30% to 35% increase in passengers by the 2035 period, nowhere near enough to keep	FEIR Section 3.8.3, Track Layout Capacity and Future Ridership, addresses these issues. The MassDOT mode shift policy called for tripling the share of non-single-occupancy vehicles, not transit specifically.

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			pace with either environmental or economic necessities.	
41	11	Frederick Salvucci	Is there [a hidden constraint or] an assumption of inadequate rolling stock capacity? Is there a signal and track capacity constraint between Back Bay and South Station that is projected to constrain capacity? Is the commitment to maintain the option for eventual service to North Station and/or Logan constraining capacity? Or might those extensions actually be needed to achieve the tripling and more of capacity needed for economic and environmental policies to be satisfied? Would the use of greater numbers of DMU services to Fairmount, to Needham, to West Station and Newton add or complicate capacity?	For the purposes of planning, rolling stock capacity was not considered to be a constraint on projected ridership growth. The proposed expansion of South Station considers and accommodates the signal and track constraints between Back Bay Station and South Station. Potential rail connections to North Station and Logan Airport are not within the scope of the SSX project and were therefore not evaluated as part of the analysis. The use of new rail technology on the south side lines are not within the scope of this project, but would not be precluded in the future.
41	12	Frederick Salvucci	Moreover, what about layup capacity which is a problem today? The only efficient near term option is to use Widett circle, which is close, and in the less complex southern direction. Readville may be essential, but how long will it take to be operational?	The SSX project continues to evaluate both the Widett Circle and the expansion of Readville – Yard 2 as future layover facilities.
42	1	Drew Volpe	The current plan is thin on details of the architecture and design of the expansion.	Details of the architecture and design of the expansion will be developed as the project progresses.
42	2	Drew Volpe	I think this site would be perfect for a significant work of public art.	Comment noted.

Table 5-3 — Amtrak Growth Summary

Amtrak	Total Daily Trains	Daily Revenue Trains	% Growth	Estimated Ridership (boardings/alightings)	% Growth
Existing	72	40	-	4,100	-
2035 No-Build	72	40	0%	5,500	34%
2035 Build	138	80	100%	9,300	69%

Table 5-4 — MBTA Growth Summary

MBTA	Total Daily Trains	Daily Revenue Trains	% Growth	Estimated Ridership (boardings/alightings)	% Growth
Existing	377	280	-	42,000	-
2035 No-Build	416	280	0%	56,000	33%
2035 Build	416	315	13%	72,000	29%

Chapter 6 – FEIR Circulation List

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6.1. Federal Agencies

Federal Aviation Administration
Attn: Amy Lind Corbett, Regional Administrator
New England Region
12 New England Executive Park
Burlington, MA 01803-5299

Federal Highway Administration
Massachusetts Division
Attn: Pamela Stephenson, Division Administrator
55 Broadway, 10th Floor
Cambridge, MA 02142

Federal Railroad Administration
Attn: Laura Shick, Environmental Protection Specialist
1200 New Jersey Avenue SE
West Building MS-20 W36-428
Washington, DC 20590

Federal Transit Administration
Attn: Mary Beth Mello, Regional Administrator
Region 1 Office
Transportation Systems Center, Kendall Square
55 Broadway, Suite 920
Cambridge, MA 02142-1093

United States Postal Service
Attn: Ronald D. Schlesinger, Manager, Maintenance Engineering Support
25 Dorchester Avenue, Room B-36
Boston, MA 02205

6.2. State Agencies

Massachusetts Executive Office of Energy and Environmental Affairs
Attn: Matthew Beaton, Secretary
100 Cambridge Street, Suite 900
Boston, MA 02114

Massachusetts Convention Center Authority
Attn: David Gibbons, Executive Director
415 Summer Street
Boston, MA 02210

Massachusetts Department of Conservation and Recreation
Attn: MEPA Coordinator
251 Causeway Street, Suite 900
Boston, MA 02114

Massachusetts Department of Energy Resources
Attn: Judith Judson, Commissioner
100 Cambridge Street, Suite 1020
Boston, MA 02114

Massachusetts Department of Energy Resources
Attn: MEPA Coordinator
100 Cambridge Street, 10th Floor
Boston, MA 02114

Massachusetts Department of Environmental Protection
Attn: Nancy Seidman, Assistant Commissioner
1 Winter Street
Boston, MA 02108

Massachusetts Department of Environmental Protection
Attn: John D. Viola, Assistant Commissioner
1 Winter Street
Boston, MA 02108

Massachusetts Department of Environmental Protection
Northeast Regional Office
Attn: Nancy Baker, Environmental/MEPA Analyst
205B Lowell Street
Wilmington, MA 01887

Massachusetts Department of Environmental Protection
Attn: MEPA Coordinator
1 Winter Street
Boston, MA 02108

Massachusetts Department of Environmental Protection
Attn: Waterways Program
1 Winter Street
Boston, MA 02108

Massachusetts Department of Environmental Protection
Attn: Bureau of Waste Site Cleanup
1 Winter Street
Boston, MA 02108

Massachusetts Department of Transportation
Highway Division District 6
Attn: MEPA Coordinator
185 Kneeland Street
Boston, MA 02111

Massachusetts Division of Marine Fisheries
Attn: MEPA Coordinator
251 Causeway Street, Suite 400
Boston, MA 02114

Massachusetts Executive Office of Housing and Economic Development
Attn: Jay Ash, Secretary
1 Ashburton Place, Room 2101
Boston, MA 02108

Massachusetts Executive Office of Labor and Workforce Development
Attn: Ronald L. Walker, II, Secretary
1 Ashburton Place, Suite 2112
Boston, MA 02108

Massachusetts Historical Commission
Attn: Brona Simon, State Historic Preservation Officer, Executive Director
The MA Archives Building
220 Morrissey Boulevard
Boston, MA 02125-3314

Massachusetts Office of Coastal Zone Management
Attn: Bruce Carlisle, Director
251 Causeway Street, Suite 800
Boston, MA 02114-2136

6.3. Railroad Operators

National Railroad Passenger Corporation (Amtrak)
Planning and Development
Attn: Drew Galloway, Department Chief, NEC Infrastructure and Investment Department
30th Street Station, Room 4N-225
Philadelphia, PA 19104

National Railroad Passenger Corporation (Amtrak)
NEC Infrastructure and Business Development
Attn: Thomas Moritz, Director Business Development
30th Street Station, Room 4N-166
Philadelphia, PA 19104

National Railroad Passenger Corporation (Amtrak)
Attn: Paul O'Mara, Superintendent of Operations
2 South Station, 5th Floor
Boston, MA 02110

6.4. Regional Organizations

Massachusetts Bay Transportation Authority
Attn: MEPA Coordinator
10 Park Plaza, 6th Floor
Boston, MA 02216-3966

Massachusetts Port Authority
Attn: Stewart Dalzell, Deputy Director, Environmental Planning and Permitting
One Harborside Drive, Suite 200S
East Boston, MA 02128-2909

Massachusetts Water Resources Authority
Attn: Marianne Connolly, Senior Program Manager
Environmental Review and Compliance
Charlestown Navy Yard
100 First Ave, Building 39
Boston, MA 02129

Metropolitan Area Planning Council
Attn: Martin Pillsbury, Environmental Planning Director
60 Temple Place, 6th Floor
Boston, MA 02111

6.5. Federal Elected Officials

Senator Elizabeth Warren
2400 JFK Federal Building
15 New Sudbury Street
Boston, MA 02203

Senator Edward Markey
975 JFK Federal Building
15 New Sudbury Street
Boston, MA 02203

Congressman Michael Capuano
110 First Street
Cambridge, MA 02141

Congressman Steven Lynch
88 Black Falcon Avenue, Suite 340
Boston, MA 02210

6.6. State Elected Officials

Senator William Brownsberger
State House, Room 504
Boston, MA 02133

Senator Sonia Chang-Diaz
State House, Room 111
Boston, MA 02133

Senator Linda Dorcena Forry
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Senator Patricia Jehlen
Co-Chair, MBTA Caucus
State House, Room 424
Boston, MA 02133

Senator Michael Rush
State House, Room 511C
Boston, MA 02133

Senator William Straus
State House, Room 134
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Senator Bruce E. Tarr
State House, Room 308
Boston, MA 02133

Speaker Robert A. DeLeo
State House, Room 356
Boston, MA 02133

Representative Nick Collins
State House, Room 39
Boston, MA 02133

Representative Sean Garballey
Co-Chair, MBTA Caucus
State House, Room 540
Boston, MA 02133

Representative Kevin Honan
State House, Room 38
Boston, MA 02133

Representative Jay Livingstone
State House, Room 136
Boston, MA 02133

Representative Aaron Michlewitz
State House, Room 254
Boston, MA 02133

Representative Michael J. Moran
State House, Room 42
Boston, MA 02133

Representative Angelo Scaccia
State House, Room 33
Boston, MA 02133

Representative Frank I. Smizik
State House, Room 274
Boston, MA 02133-1054

Representative Timothy J. Toomey
State House, Room 238
Boston, MA 02133

6.7. Local Elected Officials

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Boston City Council President
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Ayanna Pressley
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Boston, MA 02201-2043

Josh Zakim
Boston City Council
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Boston, MA 02201-2043

6.8. Local Government

Boston Conservation Commission
Attn: Charlotte Moffat, Executive Secretary
Boston City Hall, Room 801
Boston, MA 02201

Boston Environment Department
Attn: Austin Blackmon, Chief of Environment, Energy and Open Space
1 City Hall Square
Boston, MA 02201

Boston Mayor's Office
Attn: Chris Osgood, Chief of Streets, Transportation, & Sanitation
1 City Hall Square, 5th Floor
Boston, MA 02201

Boston Public Health Commission
Attn: Monica Valdes Lupi, Executive Director
1010 Massachusetts Avenue, Main Office
Boston, MA 02118

Boston Public Works Department
Attn: Michael Dennehy, Commissioner
Boston City Hall, Room 801
1 City Hall Square
Boston, MA 02201

Boston Redevelopment Authority
Attn: Sara Myerson, Director of Planning
1 City Hall Square
Boston, MA 02201

Boston Transportation Department
Attn: Gina Fiandaca, Commissioner
Boston City Hall
1 City Hall Square
Boston, MA 02201

Boston Water and Sewer Commission
Attn: John P. Sullivan, P.E., Chief Engineer
980 Harrison Avenue
Boston, MA 02119

City of Cambridge
Attn: Richard C. Rossi, City Manager
795 Massachusetts Avenue
Cambridge, MA 02139

6.9. Libraries

City of Boston Public Library
Central Branch
700 Boylston Street
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Chapter 7 – Acronyms

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7. Acronyms

AASHTO	—	American Association of State Highway and Transportation Officials
ACEC	—	Area of Critical Environmental Concern
ACGIH	—	American Conference of Governmental Industrial Hygienists
ACM	—	Asbestos Containing Materials
ACS	—	American Community Survey
ADA	—	Americans with Disabilities Act
ADCIRC	—	Advanced Circulation Model
AEC	—	Alternative Energy Credits
AMTRAK	—	National Railroad Passenger Corporation
APE	—	Area of Potential Effects
APR	—	Air Purifying Respirator
ASHRAE	—	(Formerly) American Society of Heating, Refrigerating and Air Conditioning Engineers
AUL	—	Activity and Use Limitation
BBRS	—	Board of Building Regulations and Standards
BECO	—	Boston Edison Company
BFE	—	Base Flood Elevation
BH-FRM	—	Boston Harbor Flood Risk Model
BLC	—	Boston Landmarks Commission
BMPs	—	Best Management Practices
BRA	—	Boston Redevelopment Authority
BTD	—	Boston Transportation Department
BWSC	—	Boston Water and Sewer Commission
CAA	—	U.S. Clean Air Act
CAAA	—	Clean Air Act Amendments

CEQ	—	Council on Environmental Quality
CFEP	—	Coastal Flood Exceedance Probability
CHP	—	Combined Heat and Power
CMP	—	Construction Management Plan
CMR	—	Code of Massachusetts Regulations
CNCP	—	Construction Noise Control Plan
CO	—	Carbon Monoxide
CO_2	—	Carbon Dioxide
COC	—	Chemical of Concern
CRZ	—	Contamination Reduction Zone
CSHW	—	Commonwealth Solar Hot Water Program
CSO	—	Combined Sewer Overflow
CSXT	—	CSX Transportation, Inc.
CTPS	—	Central Transportation Planning Staff
CWA	—	Clean Water Act
CZM	—	Massachusetts Office of Coastal Zone Management
dB	—	Decibel
dBA	—	A-weighted Decibels
DC	—	Direct Current
DCR	—	Massachusetts Department of Conservation and Recreation
DEIR	—	Draft Environmental Impact Report
DOER	—	Department of Energy Resources
DOS	—	Division of Occupational Safety
DOT	—	Department of Transportation
DPM	—	Diesel Particulate Matter
DPW	—	Department of Public Works
DS	—	District Steam

EA	—	Environmental Assessment
EEA	—	Executive Office of Energy and Environmental Affairs
EIR	—	Environmental Impact Report
EJ	—	Environmental Justice
ENF	—	Environmental Notification Form
EPA	—	Environmental Protection Agency
ESA	—	Environmental Site Assessment
ESLI	—	End-of-Service-Life Indicator
EZ	—	Exclusion Zone
FAA	—	Federal Aviation Administration
FEIR	—	Final Environmental Impact Report
FEMA	—	Federal Emergency Management Agency
FHWA	—	Federal Highway Administration
FIRM	—	Flood Insurance Rate Map
FR	—	Federal Register
FRA	—	Federal Railroad Administration
FTA	—	Federal Transit Administration
GHG	—	Greenhouse Gas
GIS	—	Geographic Information System
GMF	—	General Mail Facility
gpd	—	Gallons per Day
H&S	—	Health and Safety
HASP	—	Health and Safety Plan
HAZWOPER	—	Hazardous Waste Operations and Emergency Response
HEP	—	Head-End Power
HREC	—	Historical Recorded Environmental Conditions
HSG	—	Hydrologic Soil Group

HVAC	—	Heating, Ventilation, and Air Conditioning
I/I	—	Inflow and Infiltration
I-90	—	Interstate Highway 90/Massachusetts Turnpike
I-93	—	Interstate Highway 93
IDLH	—	Immediately Dangerous to Life or Health
IECC	—	International Energy Conservation Code
ILSF	—	Isolated Land Subject to Flooding
INVEST	—	Infrastructure Voluntary Evaluation Sustainability Tool
IPLV	—	Integrated Part Load Value
ISO-NE	—	ISO New England Inc.
JSA	—	Job Safety Analysis
KGS	—	Kendall Generating Station
LEED	—	Leadership in Energy and Environmental Design
Ldn	—	Day-Night Average Sound Level
Leq (h)	—	Hourly Equivalent Noise Level
LID	—	Low Impact Development
LLC	—	Limited Liability Company
Lmax	—	Maximum Noise Level
LOS	—	Level of Service
LSCSF	—	Land Subject to Coastal Storm Flowage
LSP	—	Licensed Site Professional
LUHPPL	—	Land Use of Higher Potential Pollutant Loads
M.G.L.	—	Massachusetts General Law
MAAQS	—	Massachusetts Ambient Air Quality Standards
MAPC	—	Metropolitan Area Planning Council
MassDEP	—	Massachusetts Department of Environmental Protection
MassDOT	—	Massachusetts Department of Transportation

MassGIS	—	Massachusetts Office of Geographic Information
MBTA	—	Massachusetts Bay Transportation Authority
MCP	—	Massachusetts Contingency Plan
MEPA	—	Massachusetts Environmental Policy Act
MHC	—	Massachusetts Historical Commission
MHP	—	Municipal Harbor Plan
MMBTU	—	One Million British Thermal Units
mph	—	Miles per Hour
MS4	—	Municipal Separate Storm Sewer System
MSAT	—	Mobile Source Air Toxics
MSDS	—	Material Safety Data Sheets
MSGP	—	Multi Sector General Permit
MWRA	—	Massachusetts Water Resources Authority
N/A	—	Not Applicable
NAAQS	—	National Ambient Air Quality Standards
NAVD88	—	North American Vertical Datum of 1988
NEC	—	Northeast Corridor
NEPA	—	National Environmental Policy Act of 1969
NFIP	—	National Flood Insurance Program
NFPA	—	National Fire Protection Association
NHESP	—	Massachusetts Natural Heritage and Endangered Species Program
NHPA	—	National Historic Preservation Act
NIOSH	—	National Institute for Occupational Safety and Health
NMFS	—	National Marine Fisheries Service
NO	—	Nitric Oxide
NO_2	—	Nitrogen Dioxide
NOAA	—	National Oceanic and Atmospheric Administration

NOI	—	Notice of Intent
NO_x	—	Nitrogen Oxides
NPC	—	Notice of Project Change
NPDES	—	National Pollutant Discharge Elimination System
NRCS	—	Natural Resources Conservation Service
NRHP	—	National Register of Historic Places
O&M	—	Operation and Maintenance
OCS	—	Overhead Contact System
OHM	—	Oil and/or Hazardous Material
ONS	—	Office of Neighborhood Services
ORW	—	Outstanding Resource Water
OSHA	—	Occupational Safety and Health Administration
OTP	—	On-time Performance
PAH	—	Polynuclear Aromatic Hydrocarbons
PCB	—	Polychlorinated Biphenyl
PE	—	Professional Engineer
PEL	—	Permissible Exposure Limit
PIC	—	Boston Public Improvement Commission
PIP	—	Public Involvement Plan
PM	—	Project Manager
PV	—	Photovoltaic
RAO	—	Response Action Outcome
REC	—	Recognized Environmental Condition
RTC	—	Rail Traffic Controller
RTN	—	Release Tracking Number
SCBA	—	Self-Contained Breathing Apparatus
sf	—	Square Feet

SFHA	—	Special Flood Hazards Area
SHW	—	Solar Hot Water
SIC	—	Standard Industrial Classification
SLOSH	—	Sea, Lake, and Overland Surges from Hurricanes
SLR	—	Sea Level Rise
SO_2	—	Sulfur dioxide
SOV	—	Single Occupancy Vehicle
SSAR	—	South Station Air Rights
SSHASP	—	Site-Specific Health and Safety Plan
SSO	—	Site Safety Officer
SSX	—	South Station Expansion
SWAN	—	Simulating Waves Nearshore
SWPPP	—	Stormwater Pollution Prevention Plan
SZ	—	Support Zone
TCP	—	Traffic Control Plan
TDM	—	Transportation Demand Management
TIO	—	Transportation Improvements Only
TIP	—	Task Improvement Process
TLV	—	Threshold Limit Value
TM	—	Task Manager
TMDL	—	Total Maximum Daily Load
TOD	—	Transit Oriented Development
tpy	—	Tons per Year
TSS	—	Total Suspended Solids
TTY	—	Teletypewriter, also known as Telecommunication Device for the Deaf (TDD)
U.S.	—	United States
U.S. DOT	—	United States Department of Transportation

U.S. EPA	—	United States Environmental Protection Agency
U.S.C.	—	United States Code
UFP	—	Ultrafine Particulates
USACE	—	United States Army Corp of Engineers
USDA	—	United States Department of Agriculture
USPS	—	United States Postal Service
VAV	—	Variable Air Volume
VdB	—	Vibration Decibels
VOC	—	Volatile Organic Compound
WPA	—	Massachusetts Wetland Protection Act

SOUTH STATION
EXPANSION

Appendix A - Stormwater Analysis Technical Report

June 2016

massDOT
Massachusetts Department of Transportation

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1. Introduction

This Stormwater Report has been prepared to outline the project's proposed stormwater management approach. This report also describes the plan to comply with the Massachusetts Stormwater Standards in accordance with the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00) and Water Quality Certification Regulations (314 CMR 9.00).

1.1 Site Description

The project consists of three sites: South Station (including Dorchester Avenue), Widett Circle layover facility, and Readville – Yard 2 layover facility, as shown in Figure 1. The project sites are currently covered in a combination of pervious and impervious surfaces, as shown in Table 1. They are also covered by ballast, which is a crushed stone trackbed with characteristics of both pervious and impervious surfaces.

Table 1 — Existing and Proposed Land Cover

Cover Type	Existing Cover (ac)	Proposed Cover (ac)	Change (ac)	% Change
South Station				
Impervious (pavement, buildings, etc.)	27.2	20.4	-6.8	-25%
Ballast	21.1	26.9	5.8	27%
Pervious (green space, BMPs, etc.)	0.7	1.7	1.0	143%
Total	**49.0**	**49.0**	**0.0**	
Widett Circle				
Impervious (pavement, buildings, etc.)	27.5	12.9	-14.7	-53%
Ballast	2.7	14.3	11.7	433%
Pervious (green space, BMPs, etc.)	0.0	3.0	3.0	N/A
Total	**30.2**	**30.2**	**0.0**	
Readville – Yard 2				
Impervious (pavement, buildings, etc.)	4.5	6.5	2.0	44%
Ballast	6.4	8.2	1.8	28%
Pervious (green space, BMPs, etc.)	6.6	2.8	-3.8	-58%
Total	**17.5**	**17.5**	**0.0**	

1.2 South Station

South Station occupies approximately 49 acres of land located near Chinatown, Fort Point Channel, and the South Boston Waterfront/Innovation District. The site includes the following: South Station Rail/Transit Terminal, South Station Bus Terminal, and the USPS GMF, including the portion of Dorchester Avenue fronting the site and running parallel to Fort Point Channel. The site consists of the following land cover:

- 27.2 acres of impervious buildings, parking lots, and roadways (Dorchester Avenue)
- 21.1 acres of ballasted track
- 0.7 acres of pervious open space (Rolling Bridge Park)

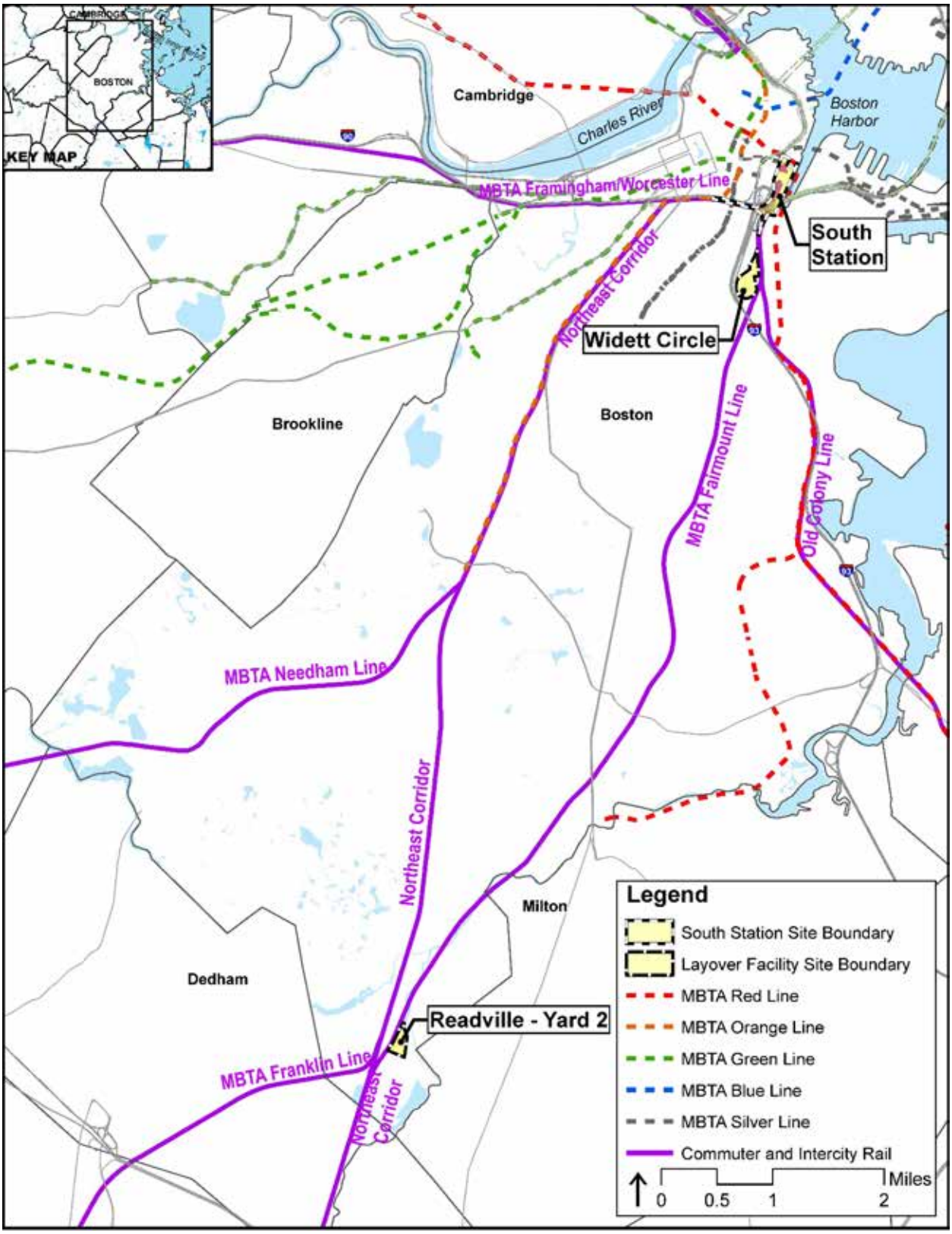


Figure 1 — Project Location Map – All Facilities

1.2.1 Layover Facilities

Widett Circle

The Widett Circle site, totaling approximately 30.2 acres, is located in South Boston along the MBTA's Fairmount Line, approximately one track-mile from South Station. It is primarily comprised of four parcels in private ownership: 100 Widett Circle (Cold Storage) and the 1 and 2 Foodmart Road parcels. The approximately 6.6 acre Cold Storage site currently houses a temperature-controlled food storage and distribution facility, owned by Art Mortgage Borrower Propco 2006 2 LP and used by Americold/Crocker & Winsor Seafoods. The building has an active rail siding served by CSX Transportation, Inc. (CSXT) with space for six freight cars. The New Boston Food Market Development Corporation, made up of approximately 30 units leased to multiple businesses in the food processing, food storage, and food logistics industry, owns 1 and 2 Foodmart Road. The fourth parcel is primarily a track easement for Amtrak under the ownership of the New Boston Food Market. The 30.2-acre site consists of the following land cover:

- 27.5 acres of impervious building, parking and storage areas
- 2.7 acres of ballasted track

Readville – Yard 2

The MBTA's Readville – Yard 2 is located in the Readville section of Hyde Park in Boston. It lies within the northeast quadrant of the intersection of the NEC and the MBTA Fairmount Line, approximately 8.8 track-miles south of South Station. Readville – Yard 2 is a maintenance repair facility and the largest layover yard used by the MBTA for its south side commuter rail service. The layover yard has a total of 12 tracks. The MBTA currently uses Readville – Yard 2 for midday layover storage of 10 trainsets of variable lengths. A portion of the adjacent property (0.7 acres) would be acquired to provide land for track expansion. The 17.5-acre site consists of the following land cover:

- 4.5 acres of impervious buildings, parking, and storage areas
- 6.4 acres of ballasted tracks
- 6.6 acres of other pervious areas

1.3 Existing Conditions

This section describes existing conditions, water resources and drainage for the three project sites.

1.3.1 South Station

The only surface water body within the South Station study area is Fort Point Channel, which is part of the Boston Harbor watershed. The Channel is located between Dorchester Avenue and the Fort Point neighborhood and extends from West Fourth Street to the south to the Evelyn Moakley Bridge to the north. The USPS GMF abuts Fort Point Channel to the west, separated from it by Dorchester Avenue.

Stormwater from the South Station site is collected into the sewer system. Based on existing plans and survey, there is no evidence of stormwater detention, infiltration, or treatment measures in place at the site. Along the western side of South Station, catch basins collect stormwater runoff along Atlantic Avenue, where it is then directed off the site through the sewer system. The station's ballasted train track area has characteristics of both pervious and impervious surfaces. Catch basins within the track area direct

stormwater to an existing six-foot, nine-inch BWSC Combined Sewer Overflow (CSO) (BOS 065) located under the tracks. Stormwater from the USPS parcel, including roof runoff, is collected by catch basins and flows through the sewer system before discharging to Fort Point Channel. In total, there are ten stormwater outfalls from the South Station site that discharge to the Fort Point Channel. It is notable that three CSOs (064, 065, and 068) are also in the immediate vicinity of the South Station site. Figure 2 depicts existing stormwater infrastructure and CSO connections.

1.3.2 Layover Facilities

Widett Circle

Widett Circle consists of existing warehouse and transportation uses. The development was constructed prior to the promulgation of the Massachusetts Stormwater Regulations, and currently does not provide water quality treatment on-site. Stormwater from Widett Circle site is currently collected in a series of catch basins within existing parking areas and along Widett Circle and Foodmart Road. Runoff from the catch basins is collected in a 36-inch storm drain. It then flows into the overflow portion of a large combined sewer that runs north to south, adjacent to the Cold Storage facility. The ultimate discharge point for overflows from the combined sewer is Fort Point Channel at CSO 070. Based on existing aerial survey, no stormwater detention, infiltration, or treatment measures are in place at Widett Circle. Based on available information, there is no stormwater quality treatment currently provided at Widett Circle.

Readville – Yard 2

Drainage from the Readville – Yard 2 site discharges to Segment ID MA73-02 of the Neponset River, an impaired Category 5 waterbody, which runs south to north just east of the site. In the northern part of the site, stormwater from the ballasted track area flows from underdrains to an existing 12-inch pipe that drains to the Neponset River. In the southern portion of the site, a 54-inch storm drain runs just east of the existing track, with stormwater traveling north to south on the abutting property to be acquired, and then turns to the east and discharges into the Neponset River. While the drain is known to collect stormwater from the neighborhood directly south of the Readville yard, the stormwater contributions of the layover site to the storm drain are unknown. Drip pans are positioned to collect any incidental drips from trains. The mixture of stormwater and drippings passes through oil/water separators before discharging to a sanitary sewer system. Based on existing aerial survey, besides the oil/water separators, no stormwater detention, infiltration, or treatment measures are in place at the Readville – Yard 2 site.

1.4 Proposed Drainage Conditions

MassDOT is proposing a robust stormwater management system that would increase stormwater quality and decrease storm event peak flow rates through the development of a comprehensive stormwater management system. This system would include structural and non-structural Best Management Practices (BMPs) designed to reduce volume and peak runoff rates and improve water quality. Examples of structural BMPs include “green infrastructure” such as infiltration basins, bioretention areas, and porous pavement, as well as traditional brick-and-mortar measures such as dry wells, deep sump catch basins, and oil/grit separators. Non-structural BMPs are institutional, educational or pollution prevention practices designed to limit the amount of stormwater runoff or pollutants that are generated in the landscape, and include practices such as requirements for routine inspections and maintenance of structural BMPs, street sweeping schedules, and snow disposal plans. The Massachusetts Department of Environmental Protection’s (MassDEP) Stormwater Handbook categorizes a subset of BMPs as Low Impact Development (LID) measures. They include impervious area reduction, bioretention areas, treebox filters, and water quality swales, among others.

The Stormwater Handbook details ten Stormwater Management Standards that are aimed at encouraging recharge and preventing stormwater discharges from causing or contributing to the pollution of the surface waters and groundwaters of the Commonwealth. As described in Section 2.2 of this document, Standard 7 states that a redevelopment project is required to meet certain Stormwater Management Standards only to the maximum extent practicable. Under these standards, two of the three project sites would qualify as redevelopment projects. The following sections describe the proposed stormwater management practices for the three project locations.

1.4.1 South Station

Improvements to the existing stormwater management system would be designed based on BWSC's *Regulations Governing the Use of Sanitary and Combined Sewers and Storm Drains of The Boston Water and Sewer Commission* (1998).

The existing sewer system at the USPS Facility location would be retained and potentially used to convey roof drainage from the proposed South Station headhouse expansion and platforms to Fort Point Channel. If it is possible to disconnect the proposed roof drains from the closed system, their flow would be routed to one of the Best Management Practices (BMP's) described below. If this is not possible, it would connect to the closed system, as it currently does in the existing condition. The existing pipe network could then be used as an outlet for the track subsurface system, abandoned or removed. If site conditions allow, flow could also be routed through a small diameter water quality structure prior to discharging into the channel. The two existing CSO pipes at the site would be retained and used for drainage connections. Measures to treat stormwater runoff would be employed to remove total suspended solids (TSS) and other pollutants from stormwater runoff. Due to site limitations and the vertical separation between the Fort Point Channel and the site, many BMPs are not practical to employ. Measures that would be practical to employ include deep sump catch basins, water quality structures and proprietary separators.

As shown in Table 1, the proposed project would reduce impervious coverage at the South Station site by 25%. Proposed permeable cover may include LID measures such as pervious pavers with underdrains for the sidewalks and the Harborwalk, vegetated open spaces, bioretention areas, green roofs and/or tree box filters. Figure 3 shows the potential location for a large bioretention area, while Figures 4 and 5 depict typical details for LID strategies including surface basins, porous asphalt, tree box filters, and permeable pavers. These features would be implemented, as appropriate, to promote water quality treatment prior to discharging into the sewer system and ultimately into Fort Point Channel.

Since some LID features would be above ground, they would provide aesthetic benefits to the public in addition to water quality benefits. The more creative water quality measures used in the public spaces could also prove to be an opportunity for public education with signage detailing the design features and their role in the water quality process.

The proposed stormwater management practices along the redeveloped Dorchester Avenue, as shown in Figures 6 and 7, would consist of deep sump catch basins with hoods to collect stormwater and reinforced concrete pipes and manholes to convey runoff to existing outfalls along Fort Point Channel. No new outfalls are proposed.

Stormwater management for the tracks and platforms would be designed based on the MBTA *Commuter Rail Design Standards Manual*. Drainage for the track area would consist of ballast underlain with a relatively impervious subgrade crowned at each track centerline. A ditch or perforated subdrain on either side of the tracks would collect stormwater and convey it to a catch basin or manhole and sewer system.

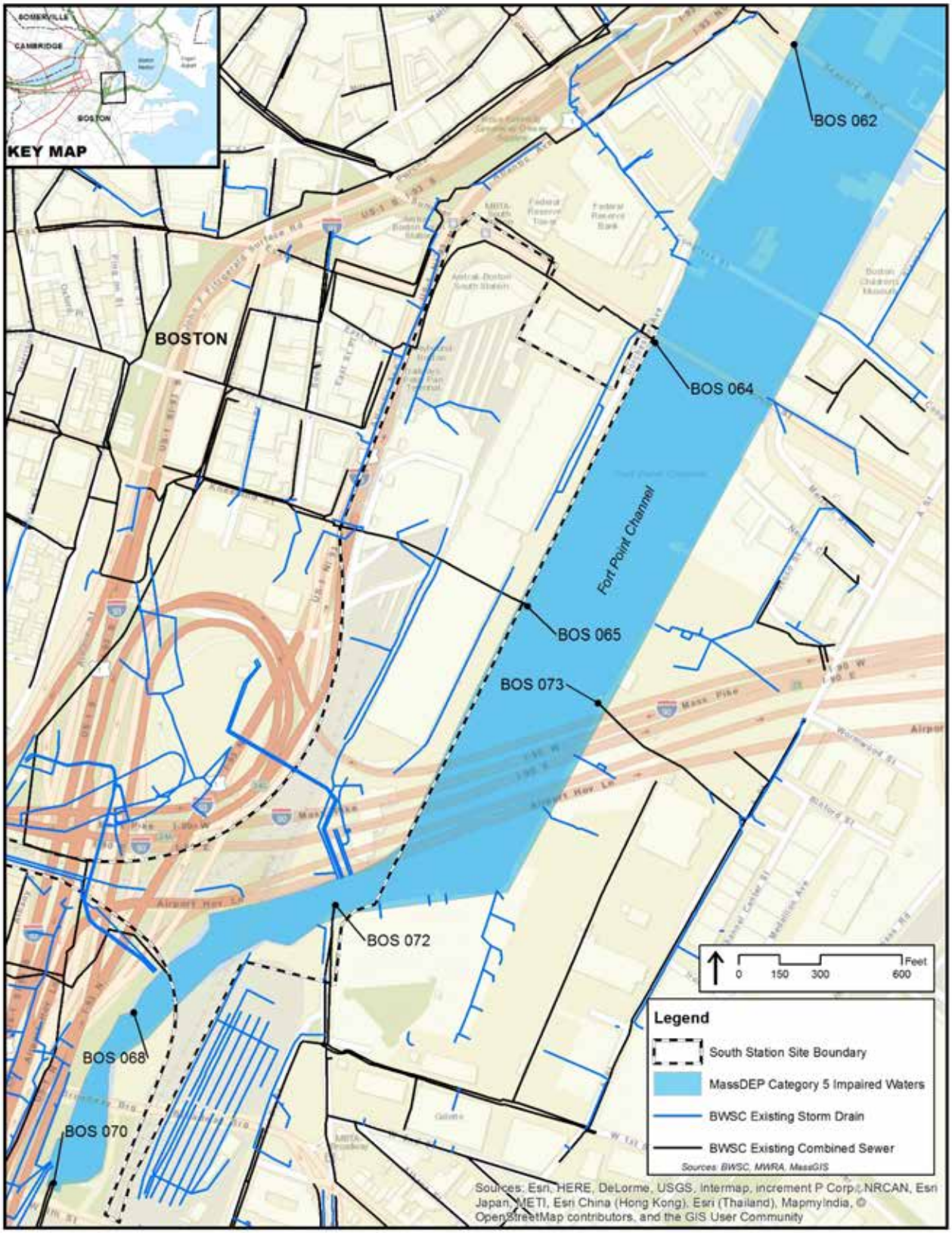


Figure 2 — Existing Stormwater Infrastructure – South Station

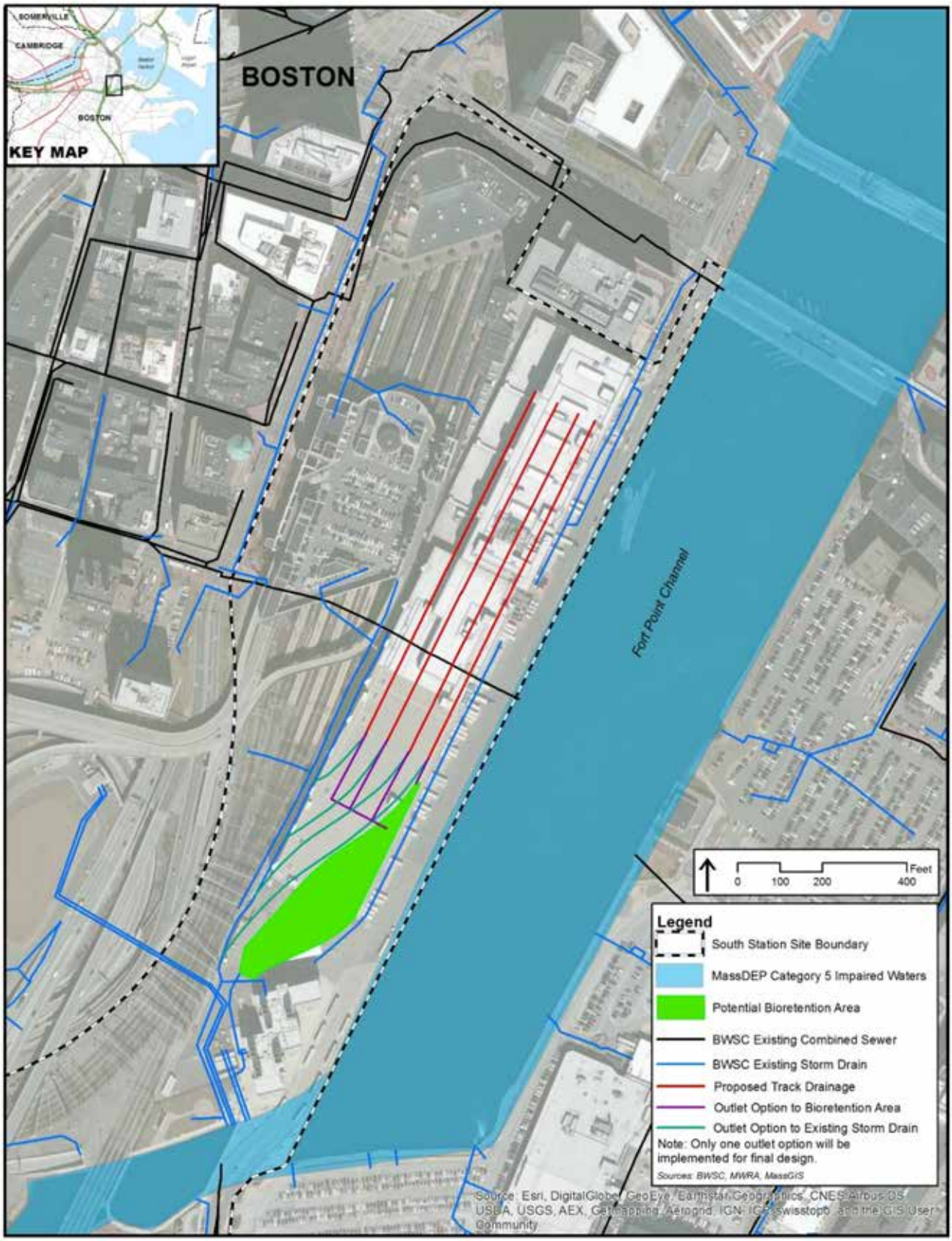


Figure 3 — Stormwater Management – South Station

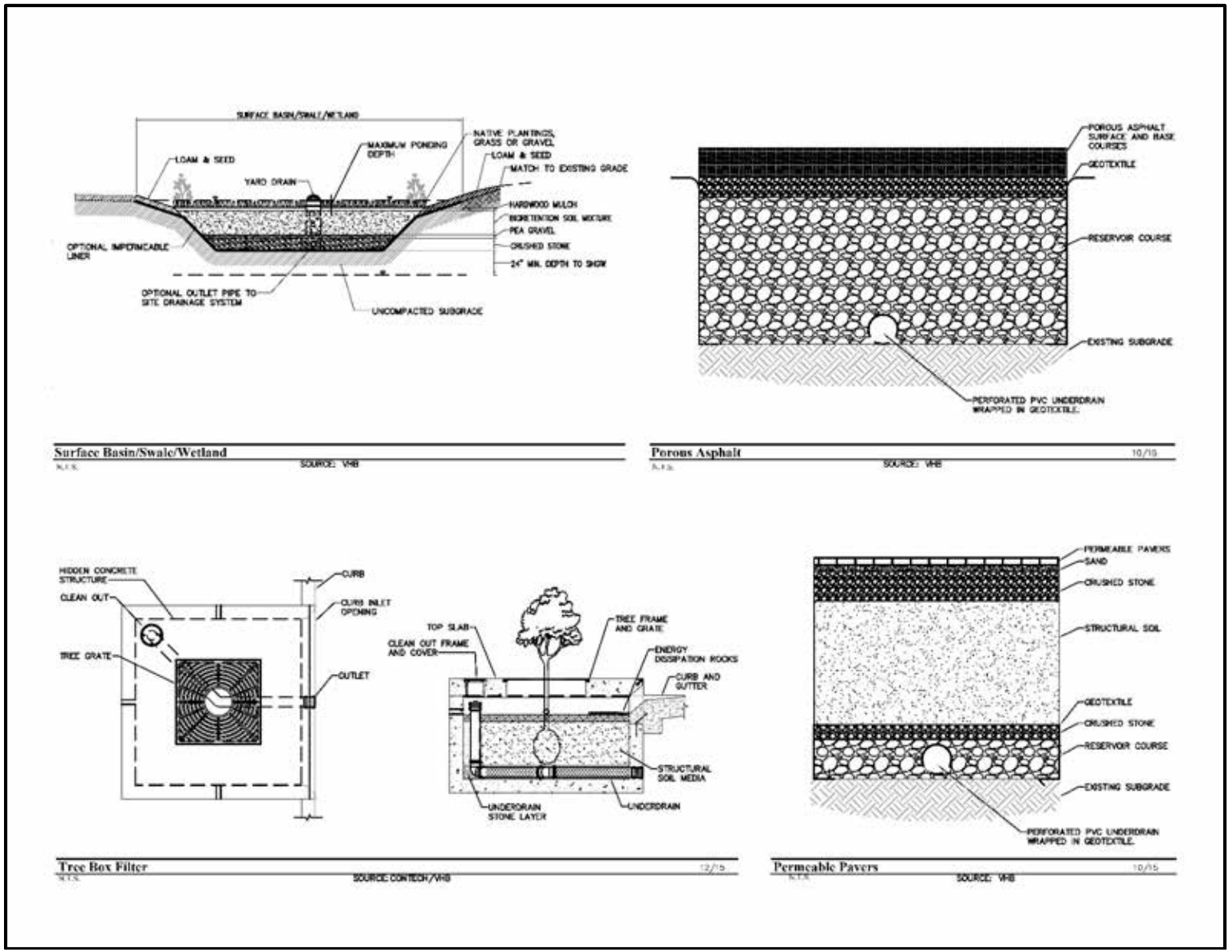
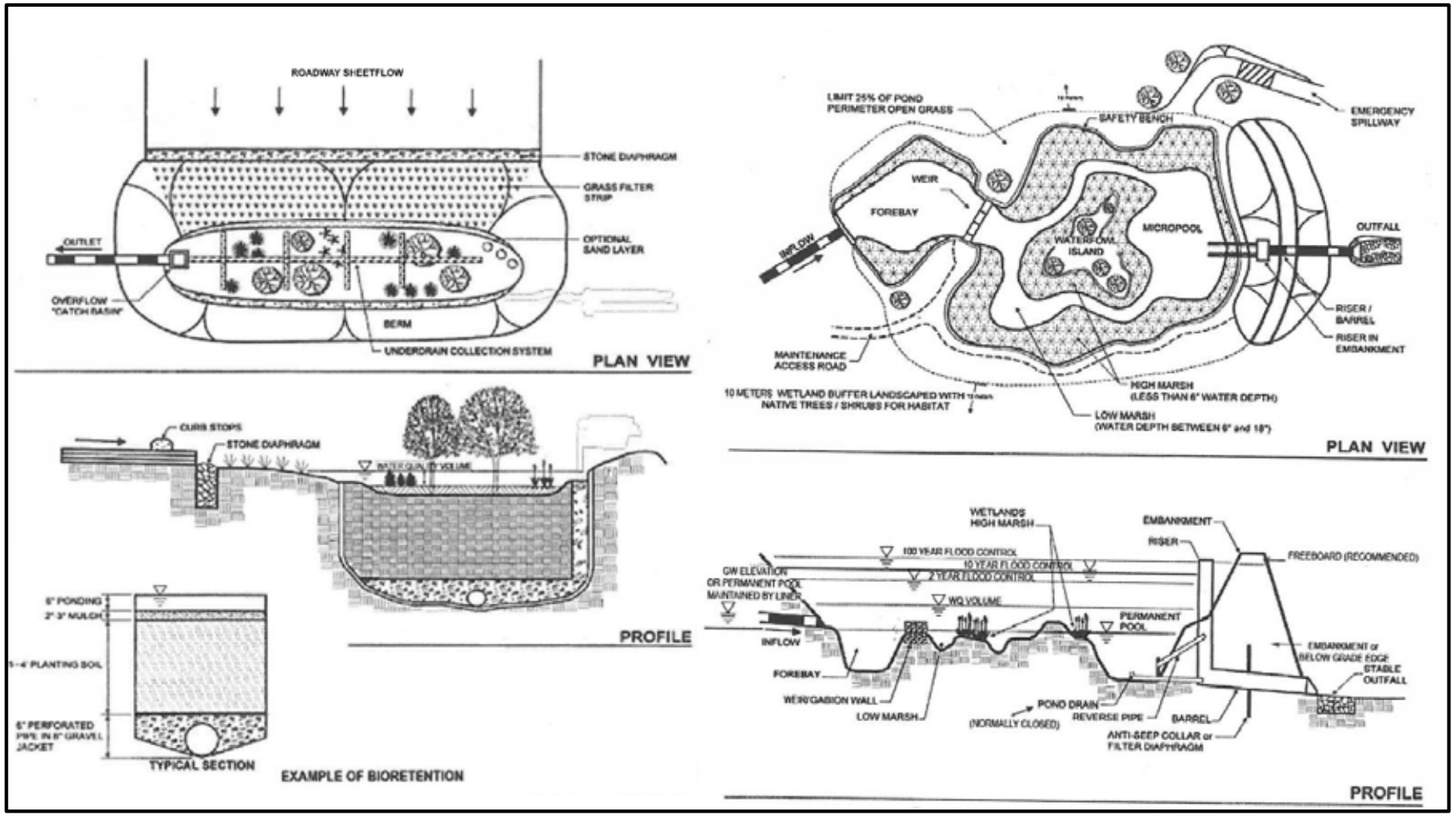


Figure 4 — Stormwater BMP Details



Source: Adapted from Massachusetts Stormwater Handbook, Volume 2 Chapter 2

Figure 5 — Stormwater Bioretention BMP Details

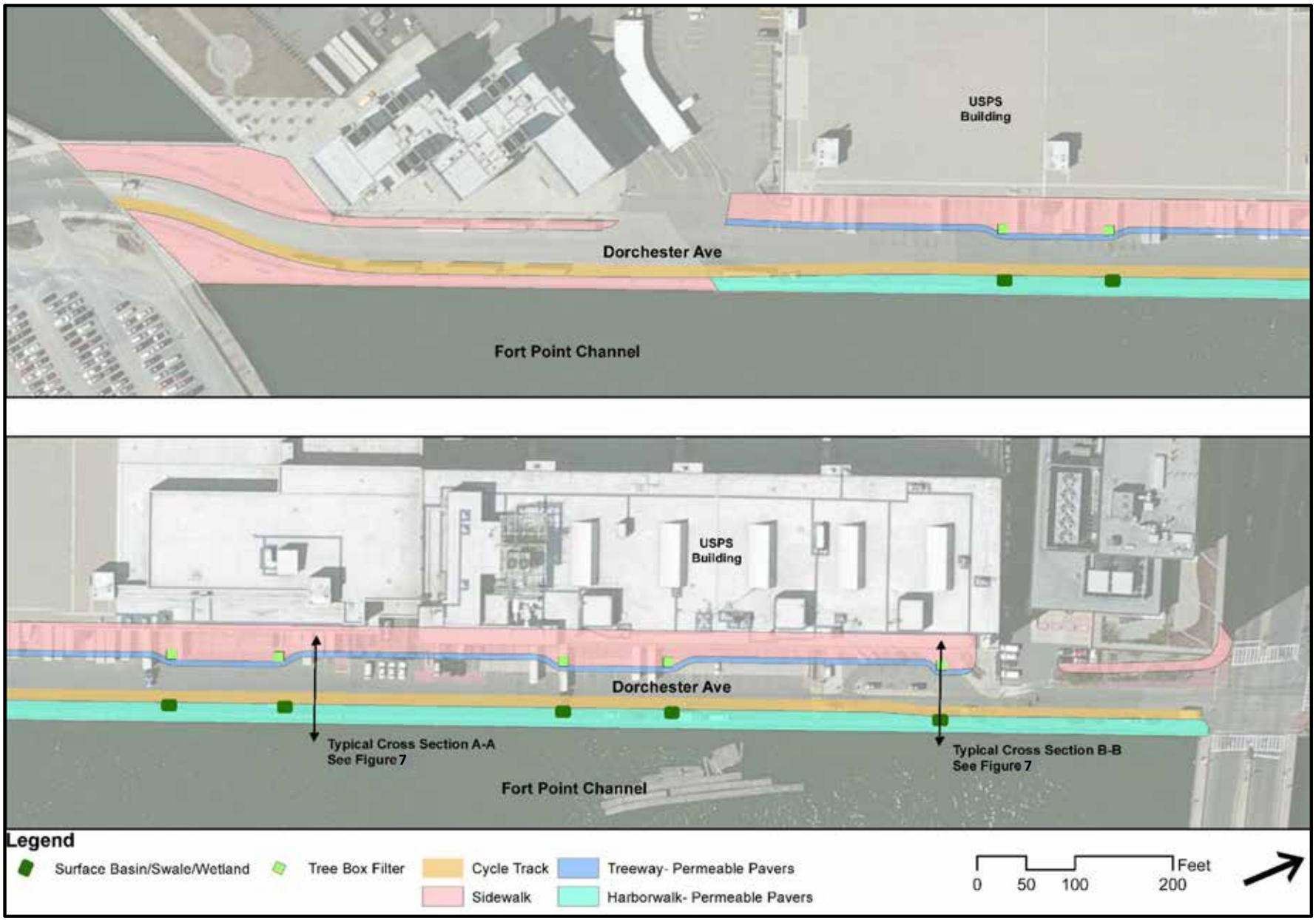


Figure 6 — Stormwater Management – Dorchester Avenue Plan View

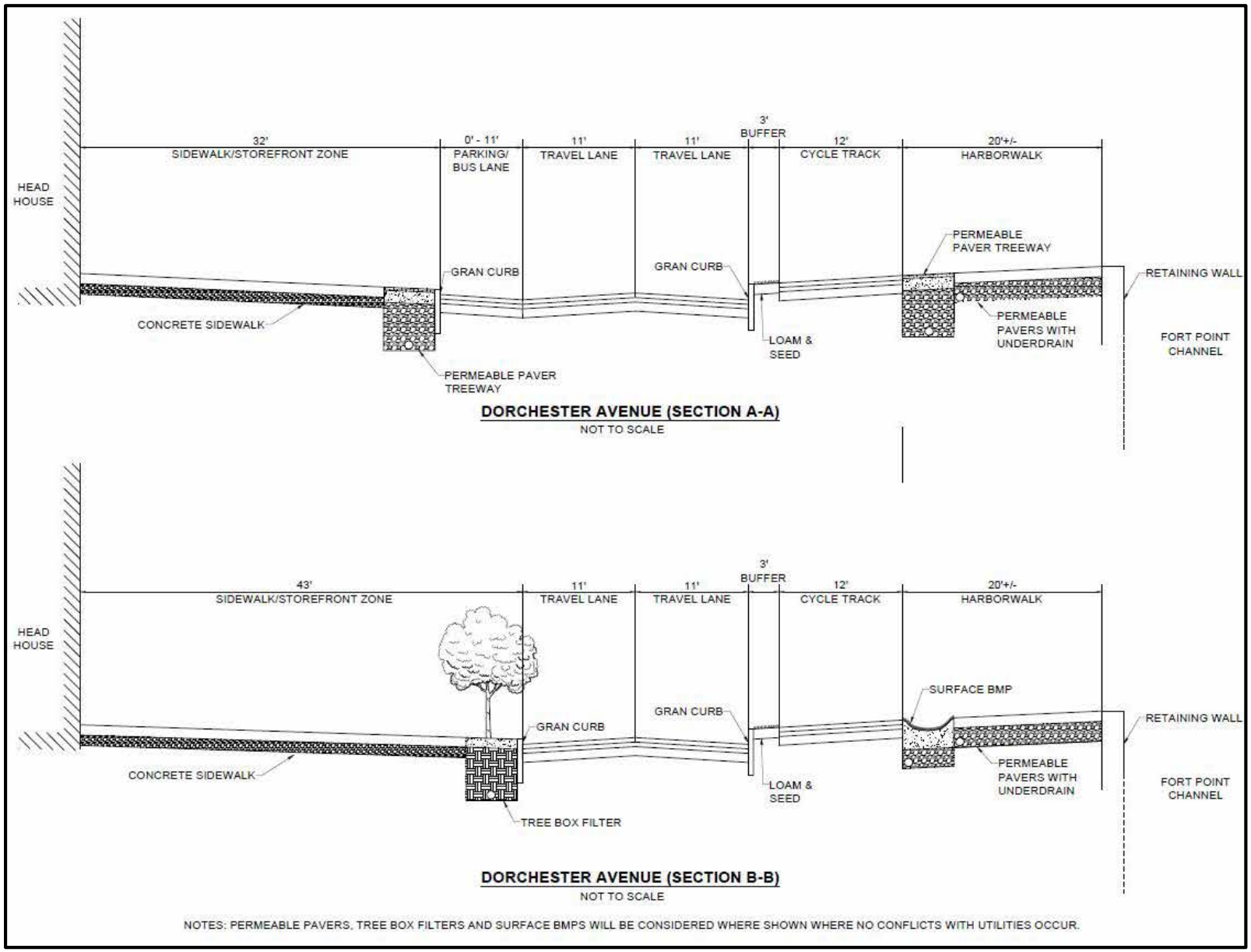


Figure 7 — Stormwater Management – Dorchester Avenue Section

1.4.2 Layover Facilities

The project would be designed to promote infiltration where possible, to increase groundwater recharge and to provide water quality treatment at the layover facility sites. Infiltration BMPs typically offer more pollutant removal over non-infiltration BMPs. However, where infiltration would not be appropriate on contaminated sites, it would be restricted.

While infiltration may be restricted at Readville – Yard 2 due to existing soil/groundwater contamination, subsequent testing may allow for site-wide infiltration or pockets of infiltration. Additionally, due to the site's proximity to the Neponset River, and as indicated by visible pockets of standing water on portions of the site, high groundwater and poor draining soils may further restrict infiltration opportunities. Test pits and borings would be completed during the final design phases to determine the hydraulic conductivity and groundwater elevation at the potential BMP locations.

Because of the potential restrictions on stormwater infiltration, MassDOT is proposing multiple approaches to BMP design at both layover facility sites:

- Approach #1: Infiltration for all proposed stormwater BMPs;
- Approach #2: A combination of infiltration and non-infiltration stormwater BMPs if pockets of clean/well-draining soils are located on-site; and
- Approach #3: No infiltration stormwater BMPs. All BMPs would include impermeable liner and underdrain to prevent infiltration.

Table 2 includes a summary of the BMPs proposed for layover facilities.

Table 2 — Stormwater BMP Approaches for Widett Circle and Readville – Yard 2

Potential BMP		Approach 1 + 2	Approach 3	TSS Removal *	Description
Pretreatment BMPs					
Catch Basins with Deep Sumps		x	x	25%	Catch basin with 4 - foot sump and oil/debris trap
Drip Pans		x	x	NA	Pans to be placed at locations to catch drips from locomotives
Oil/Water Separators		x	x	25%	Concrete chambers to separate oil and floatables from stormwater. Required by plumbing code
Treatment BMPs					
Porous Pavement	Unlined	x		80%	Consists of four layers - (porous asphalt, stone choker course, sand/gravel layer, filter blanket, reservoir course).
	Lined		x	80%	
Surface BMP	Unlined	x		80%	Surface BMP that filtrates stormwater through the soil media such as basin, swale, or gravel wetland. If infiltration is not feasible, the surface bmp can be lined or underdrained. Swale can be planted with grass/limited vegetation.
	Lined		x	80%	
Leaching Basins		x		80%	Open pit leaching catch basin
Infiltration Basins		x		80%	Infiltrating vegetated basin
Green Roofs		x	x	NA	Vegetated garden on building roofs

* TSS Removal Rates from Massachusetts Stormwater Handbook

Level of Design

Currently the proposed layover facilities have been developed to a conceptual design level based upon record existing conditions information. Project design is ongoing, and as such, the project and stormwater BMPs presented in the FEIR are preliminary only. The final locations and design would be determined as design progresses. MassDOT would confirm the locations of existing utilities and constraints located at the project sites by completing a ground field survey. Additionally the project would complete Phase II environmental testing, which would inform the final design of the stormwater management system prior to construction. The stormwater management systems would be designed based on the MBTA *Commuter Rail Design Standards Manual*. The BMPs selected would be designed to comply with the Stormwater Management Regulation as listed below, and would provide an improvement in stormwater quality over existing conditions.

Widett Circle

Track drainage at Widett Circle would consist of track ballast underlain with a relatively impervious subgrade crowned at each track centerline. A ditch or subdrain on either side of the tracks would collect stormwater and convey it to a catch basin or manhole and sewer system. Each locomotive storage area, at the end of each track, would be equipped with a drip pan to collect potential contaminants. The drip pans would connect to an oil/water separator for stormwater pre-treatment before entering the sewer system. Stormwater from the pavement areas and buildings would be directed into stormwater BMPs where feasible before connecting into the sewer system.

Stormwater from the Widett Circle site would be directed off-site via an existing connection to the 17-foot by 13.5-foot BWSC CSO that runs under the Widett Circle roadway and discharges into Fort Point Channel. MassDOT would coordinate with BWSC during the design of connections to the existing CSO or drainage system.

Pervious areas on the eastern and western sections of the site, around the proposed buildings, and to the west of the existing Cold Storage building may be suitable for surface stormwater management BMPs. Since the project would reduce the impervious area on-site, there would be an improvement over existing conditions by reducing the pollutant loading from the project site. Existing soils at the Widett Circle site are classified as urban land.

Figure 8 shows the proposed land covers and the potential BMP types and locations available at the Widett Circle site. As design development progresses the project would select final BMP type and locations that work within the projects constraints. In addition to the areas shown, porous pavement and green roofs may be incorporated into the new pavement and building design.

Readville – Yard 2

Track drainage at Readville – Yard 2 would be similar to the existing stormwater management in place for the existing tracks. This would consist of a centerline crown on each track and a ditch or subdrain on either side of the tracks to collect stormwater and convey it to a catch basin and sewer system. Each locomotive storage area, located at the end of each track, would be equipped with a drip pan to collect any potential contaminants. The drip pans would connect to an oil/water separator for stormwater pre-treated before entering the sanitary sewer system. MassDOT would inspect the existing on-site storm drains described in Section 1.3.2 of this document and assess their condition to determine if the pipes should be relocated, replaced or if a structural liner could be installed. Drainage from the site would connect to one or both of these pipes.

Figure 9 shows the proposed land covers and the potential BMP types and locations available at the Readville – Yard 2 site. In addition to the areas shown, porous pavement and green roofs may be incorporated into the new pavement and building design.

2. Regulatory Compliance

2.1 Clean Water Act

Section 401 of the federal Clean Water Act (CWA) (33 USC 1251-1376), and the regulations that implement the Act, require the enhancement and protection of surface waters from pollution to ensure they are capable of supporting their designated uses. Under the CWA, the U.S. Environmental Protection Agency (EPA) in partnership with MassDEP administers the National Pollutant Discharge Elimination System (NPDES) permit program, which regulates point source discharges to waters of the United States to control water pollution. The City of Boston and BWSC are authorized to discharge stormwater in accordance with the NPDES Municipal Separate Storm Sewer System (MS4) General Permit. The MS4 General Permit includes numerous requirements to improve stormwater management through public education, upgraded infrastructure, and municipal bylaws. The permit also requires cities to locate and correct any unauthorized sewage discharges into the stormwater system. The project would be subject to approval from the BWSC, and they would ensure the project complies with the City's MS4 General Permit and would not result in any new discharges specifically regulated under the CWA.

2.1.1 Neponset River TMDL

Under Section 303(d) of the CWA, the Neponset River has been determined to be impaired as it does not meet the established water quality standards. A total maximum daily load (TMDL) of bacteria for the Neponset River has been developed. The TMDL report identifies major contributors to the bacteria impairment including illicit discharges to storm drains, leaking sanitary sewers, failing septic systems, and stormwater runoff. It specifies both general and specific discharge limits that must be met in order to reduce the bacteria loading and improve the health of the Neponset River.

Stormwater at Readville – Yard 2 discharges to the Neponset River. Bacteria sources from the Readville – Yard 2 site are expected to be negligible. Wastewater from the site would be discharged to a separate sanitary sewer system. Wastewater impacts are discussed in DEIR Appendix 8 - *Water Supply and Wastewater Technical Report*. On-board sanitary facilities and on-site sanitary sewer systems would be designed to eliminate the potential for pathogens to reach the Neponset River. Stormwater BMPs designed to treat urban pollutants would treat ambient bacteria, such as from birds and other wildlife, on the site.

2.1.2 National Pollutant Discharge Elimination System

Industrial activities such as material handling and storage, equipment maintenance and cleaning, and storage of vehicles can be exposed to stormwater and therefore regulated under the NPDES Multi-Sector General Permit (MSGP). Layover facilities are included in the Industrial Sector P: *Land Transportation and Warehousing* and therefore regulated under the NPDES MSGP. Layover facilities fall under the standard industrial classification (SIC) 4011 and 4013 which includes rail transportation facilities. A permit via EPA's NPDES program would be required for the layover facility sites and could include stormwater effluent limits, monitoring requirements, and other conditions related to post-construction operations at the facility.

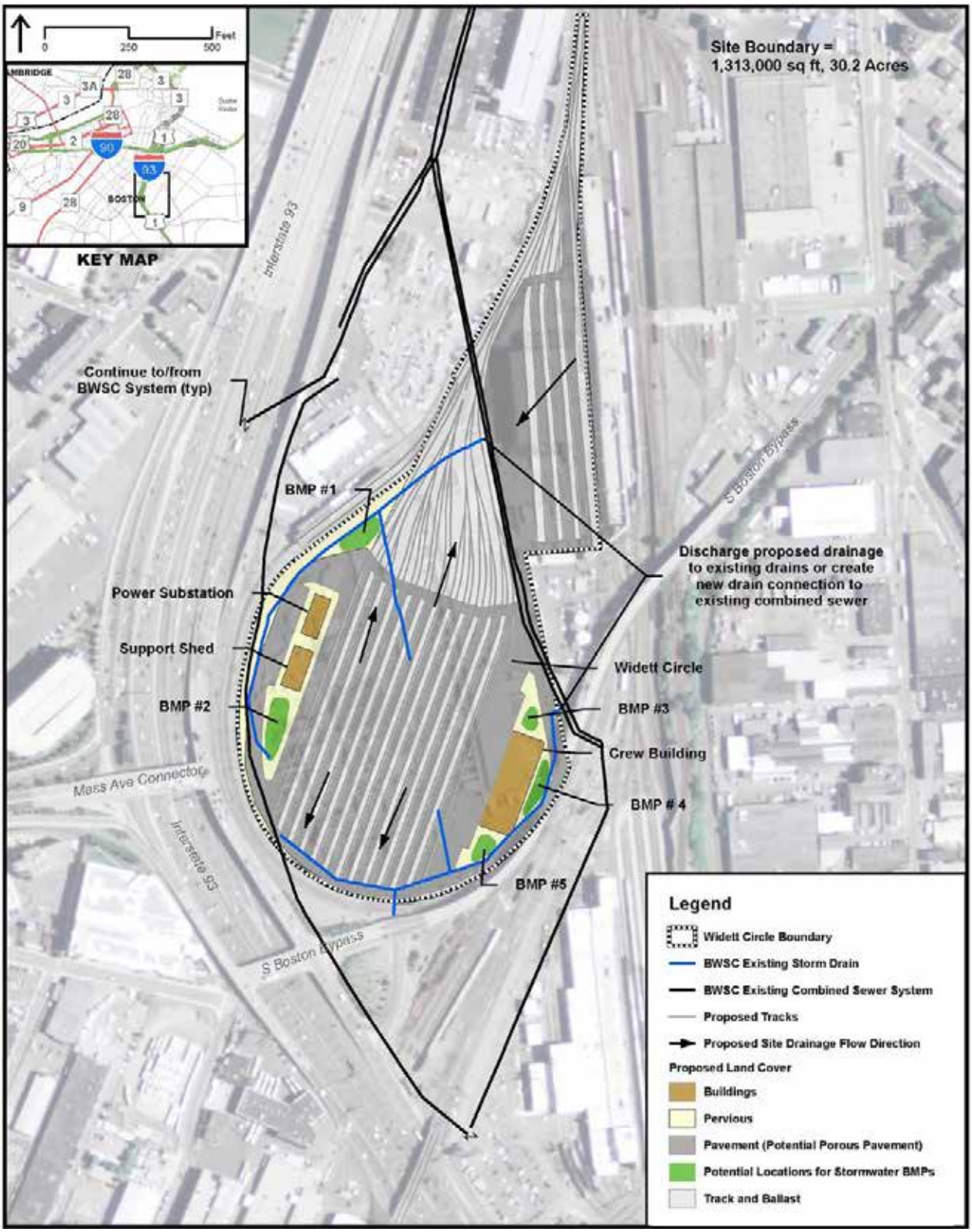


Figure 8 — Stormwater Management – Widett Circle Layover Facility

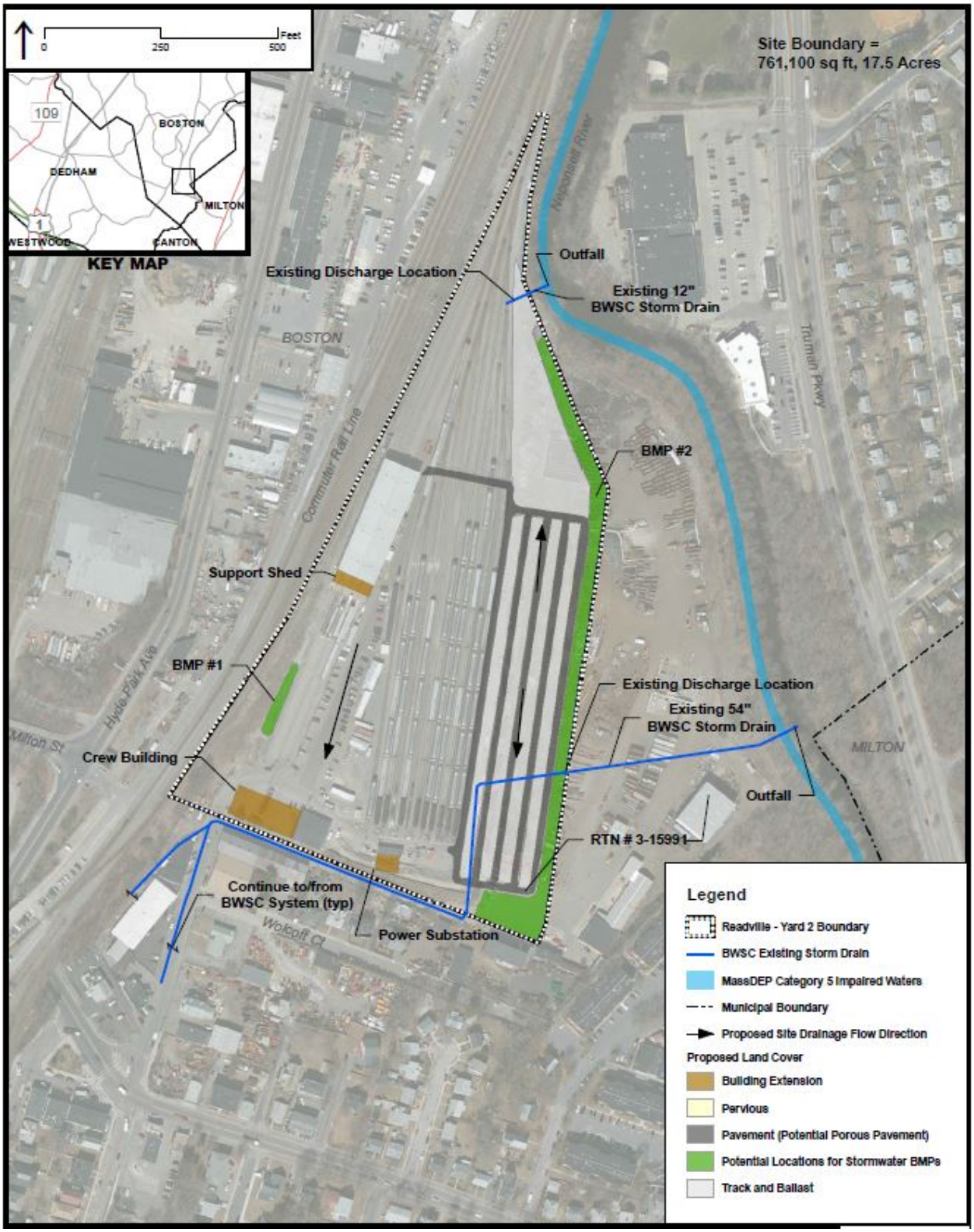


Figure 9 — Stormwater Management – Readville — Yard 2 Layover Facility

Construction at all SSX project sites would require a NPDES Construction General Permit, which regulates erosion control, pollution prevention, and stormwater management (including construction dewatering) at construction sites larger than one acre. A Stormwater Pollution Prevention Plan (SWPPP) is required by the NPDES Construction General Permit and must identify potential pollutant source areas and describe measures to be employed for erosion and sedimentation control, temporary stormwater management, dust control, and winter stabilization. The SWPPP would be completed during the final design phase and would be implemented by the project contractor.

2.2 Massachusetts Department of Environmental Protection Stormwater Management Standards

The Massachusetts Stormwater Management Standards became applicable under the Massachusetts Wetlands Protection Act (WPA) regulations (310 CMR 10.00) in 2008. MassDEP ensures compliance with the Massachusetts Stormwater Management Standards as part of its review of projects subject to the WPA. The SSX project would be subject to the WPA because there are jurisdictional wetland resource areas on two of the three project sites. For a full description and graphic depiction of the jurisdictional wetland resource areas see FEIR Section 3.4, Wetlands.

Under the Massachusetts Stormwater Management Standards, most elements of the SSX project would qualify as redevelopment projects, which are defined as: "development, rehabilitation, expansion and phased projects on previously developed sites, provided the redevelopment results in no net increase in impervious area." SSX project activities at the South Station and Widett Circle sites would be considered redevelopment projects as they would occur on previously developed sites and would result in no net increase in impervious cover. SSX project activities at the Readville – Yard 2 site would not constitute redevelopment as track expansion would convert permeable land to impervious tracks and ballast.

Below is a summary of how the SSX project would comply with the Massachusetts Stormwater Management Standards.

2.2.1 Standard 1: No New Untreated Discharges or Erosion to Wetlands

Standard 1 states that no new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. All three project sites would be designed to fully comply with Standard 1. The BMPs included in the proposed stormwater management system would be designed in accordance with the Massachusetts Stormwater Handbook. All project elements would drain to existing municipal storm sewers.

2.2.2 Standard 2: Peak Rate Attenuation

Standard 2 states that stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

South Station Site

At South Station, due to the reduction in impervious area, all peak flows and peak runoff volumes in the post-development condition would be less than the pre-development condition, resulting in an improvement over existing conditions (shown in Table 3). However, due to the presence of land subject to coastal storm flowage on the project site, MassDOT would request a waiver from Standard 2 requirements.

Table 3 — South Station Existing Peak Flow Rates and Runoff Volumes

Storm Event	24-Hour Rainfall Depth (in)	Peak Flow (ft^3/sec)	Runoff Volume (ft^3)
2-year	3.3	165	463,000
10-year	4.9	233	749,000
50-year	7.4	327	1,189,000
100-year	8.8	377	1,444,000

Widett Circle

The Widett Circle project site is considered as redevelopment under Standard 7 (described in Section 2.2.7), and is required to meet Standard 2 to the maximum extent practicable. Although the project is a redevelopment, based on current information the site could be designed to fully comply with Standard 2 by providing a reduction in peak flow rates from existing conditions.

The rainfall-runoff response of the site under existing and proposed conditions was analyzed for storm events with recurrence intervals of 2, 10, 50 and 100-years. Table 4 summarizes the results of the analysis. Additionally the project was conservative in its peak flow and volume calculation and did not account for the expected reductions due to the volume of storage provided by the proposed BMPs and potentially feasible infiltration.

Table 4 — Widett Circle Peak Flow Rates and Runoff Volumes

Storm Event	24-Hour Rainfall Depth(in)	Existing Peak Flow (ft^3/sec)	Existing Runoff Volume (ft^3)	Proposed Peak Flow (ft^3/sec)	Proposed Runoff Volume (ft^3)
2-yr	3.3	73.8	319,000	65.3	263,400
10-yr	4.9	104.5	497,500	97.9	436,700
50-yr	7.4	147.4	770,400	142.5	705,700
100-yr	8.8	171.4	927,700	167.2	861,700

At the Widett Circle site, the project would result in a reduction in peak flow rates and runoff volume for each storm events due to the decrease of impervious cover. Once design is finalized and BMP type, location, and sizing are determined, the peak flow rates would be recalculated to include additional peak rate attenuation from the BMPs and possible infiltration. The inclusion of the BMPs would further reduce the peak flow rates and volumes from existing conditions.

Readville – Yard 2

The Readville – Yard 2 project site would be designed to comply with Standard 2. Stormwater BMPs would be installed to ensure peak flow rates are reduced to pre-development rates.

The rainfall-runoff response of the site under existing and proposed conditions was analyzed for storm events with recurrence intervals of 2, 10, 50 and 100-years. Table 5 summarizes the results of the analysis.

Table 5 — Readville – Yard 2 Peak Flow Rates and Runoff Volumes

Storm Event	24-Hour Rainfall (in)	Existing Peak Flow (ft^3)	Existing Runoff Volume (ft^3)	Proposed Peak Flow (ft^3/sec)	Proposed Runoff Volume (ft^3)
2-yr	3.3	35.5	141,100	36.7	146,800
10-yr	4.9	54.6	239,700	55.7	246,400
50-yr	7.4	81.0	394,200	81.8	401,600
100-yr	8.8	95.4	484,200	96.2	491,800

As a result of the project the proposed peak flow and runoff volumes are estimated to increase from existing conditions. Similar to Widett Circle, peak flow rates and volumes presented in Table 5 do not include stormwater BMPs and potential infiltration that would reduce both peak flow rates and volumes. During the design development phase, the BMPs would be designed to meet Standard 2, and reduce peak flow rates from existing conditions.

2.2.3 Standard 3: Stormwater Recharge

Standard 3 states that loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater BMPs, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

The project would meet this standard to the maximum extent practicable in accordance with Standard 7 for the South Station and Widett Circle sites. If infiltration is deemed feasible based on soil information, groundwater elevation, and potential contamination, the Readville – Yard 2 site would be designed to fully comply with Standard 3.

South Station

Due to the reduction in impervious coverage, the South Station site would only be required to provide infiltration to meet Standard 3 to the maximum extent practicable, therefore there is no required recharge volume. Table 6 shows the result of the application of the Static Method to calculate the potential recharge volume provided by the bio-retention area, which would be designed to drain completely within 72 hours.

Table 6 — Potential BMP Recharge Volume for South Station

Infiltration BMP	Potential Recharge Volume (ft^3)
Bioretention Area	41,800

Several different BMPs are proposed along Dorchester Avenue including permeable pavers, treebox filters, and surface BMPs such as basins, swales, or gravel wetlands (see Figure 8). The South Station site abuts Fort Point Channel, where it is supported by a granite block sea wall. Infiltration stormwater BMPs in this location could result in the creation of hydrostatic pressure against the retaining wall, and stormwater could move horizontally and breakout through the wall. In order to avoid potential structural issues caused by the movement of infiltrated groundwater, the project would include an underdrain and impermeable liner beneath the stormwater BMPs. The BMPs would be designed to provide water quality improvements only.

Widett Circle

Due to the reduction in impervious coverage, the Widett Circle site would only be required to provide infiltration to meet Standard 3 to the maximum extent practicable, therefore there is no required recharge volume. Table 7 shows the result of the application of the Static Method to calculate the potential approximate recharge volume from BMPs located in the designated areas shown in Figure 8. Additional subsurface soil/groundwater investigation would determine the feasibility of infiltration at this project site, which may be limited due to poorly draining soils, soil/groundwater contamination, and/or high groundwater levels.

Table 7 — Potential BMP Recharge Volume for Widett Circle

Infiltration BMP Location	Potential Recharge Volume (ft^3)
Widett BMP #1	12,300
Widett BMP #2	16,300
Widett BMP #3-5	19,600
Total	**48,200**

Readville – Yard 2

Unlike at South Station and Widett Circle, the project would result in an increase in impervious area at the Readville – Yard 2 site, making it a new development under the Stormwater Management Standards, which would require full compliance with Standard 3. A preliminary analysis was conducted to determine the required recharge volume, which is based on the assumption that the soils are in hydrologic soil group "C" and the project site has an additional 2.0 acres of impervious cover over existing conditions. In accordance with the Stormwater Handbook, the required recharge volume for the site is 1,820 cubic feet.

Additional subsurface soil/groundwater investigation would determine the feasibility of infiltration at the project site, which may be limited due to soil/groundwater contamination and high groundwater levels. As shown in Table 8, if the project is able to utilize infiltration within all of the proposed BMPs, it would meet the required water quality volume for the project. Additionally, if porous pavement is selected rather than a surface BMP during design development, the project would infiltrate all of the stormwater from the porous pavement surfaces.

Table 8 — Potential BMP Recharge Volume for Readville – Yard 2

Infiltration BMP Location	Potential Recharge Volume (ft^3)
Readville BMP #1	55,000
Readville BMP #2	4,000
Total	**59,000**

2.2.4 Standard 4: Water Quality

Standard 4 states that stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This standard is met when:

- Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;
- Structural stormwater best management practices are sized to capture the required water quality volume as determined in accordance with the Massachusetts Stormwater Handbook; and
- Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

If necessary, the project may seek relief under Stormwater Management Standard 7 for the South Station and Widett Circle sites, and would comply with Standard 4 to the maximum extent practicable. The Readville – Yard 2 site would be designed to fully comply with Standard 4.

As required by Stormwater Standards 4 and 6, once design development is complete, MassDOT would develop a Long-Term Pollution Prevention Plan for all project sites (with the exception of Dorchester Avenue, which would be maintained under a Long-Term Pollution Prevention Plan developed by the City of Boston or its designee). The statuary basis for this is the Stormwater Management Regulations and Wetlands Protection Act.

South Station Site

Structural stormwater BMPs would be installed at the South Station site to provide as close to 80% TSS removal of stormwater runoff from all proposed impervious surfaces as possible. Table 9 presents a list of the potential BMPs and their independent removal efficiencies.

Table 9 — Summary of TSS BMP Calculations

Potential BMP	TSS Removal Efficiency (%)
Bioretention Area (with pretreatment)	90
Tree Box Filter (with pretreatment)	80
Deep Sump Catch Basin	25
Porous Pavement	80
Green Roof	0

When BMP measures are used sequentially, the removal rate of the combined system increases. Prior to final design the TSS removal efficiencies of the combined BMPs would be calculated using the "TSS Removal Calculation Worksheet" to arrive at a final TSS removal efficiency at the South Station site.

Water quality storage of stormwater would be provided through the installation of the bioretention area. There is potentially 1.0 acre of land between the rail yard and Dorchester Avenue to accommodate the bioretention area. Site limitations would dictate the ultimate size and depth of the bioretention area.

Table 10 presents a summary of the infiltration BMPs proposed for the site. If the bioretention area does exceed the volumetric requirements for groundwater storage in accordance with the Stormwater Management Standards, the additional space could be applied to handling excess volume from extreme rain events.

Table 10 — Potential Water Quality Storage Volume for South Station

Infiltration BMP	Potential Storage Volume (ft^3) (1 ft vertical ponding)
Bioretention Area	41,800

Several potential stormwater BMPs are proposed along Dorchester Avenue. These BMPs would utilize low impact development and Boston Complete Streets techniques in its design. The potential BMPs would improve water quality over existing conditions by providing a comprehensive stormwater management system and a reduction in impervious cover. Figures 3 through 7 highlight the potential BMP types, locations, and details proposed at the project site. While there is no required storage volume due to the site's status as a redevelopment project, Table 11 shows the approximate potential storage volume for four BMP measures.

Table 11 — Potential Water Quality Storage Volumes for Dorchester Avenue

BMP	Potential Storage Volume (ft^3)
Treeway - Permeable Pavers	3,500*
Harborwalk - Permeable Pavers	13,000*
Surface BMPs - approx. 7	300
Tree Boxes	NA
Total	**16,800**

* Assumes 1.0 ft reservoir course and 40% voids.

Widett Circle

Table 2, Stormwater BMP Approaches for Widett Circle and Readville – Yard 2, identifies treatment and pretreatment BMPs proposed for TSS removal. These BMPs could potentially be constructed at various locations within the Widett Circle site, as indicated in Table 12 and Figure 8.

The project would result in a reduction in impervious surfaces (pavement and buildings) of 14.5 acres, with a corresponding reduction in the pollutant load as compared to existing conditions. As design progresses, additional opportunities would be sought to further reduce the footprint of the impervious area. The project would improve the water quality at Widett Circle with the incorporation of a comprehensive stormwater management system by reducing impervious cover and providing stormwater BMPs.

While there is no required storage volume due to the site's status as a redevelopment project, Table 12 shows the approximate potential storage and treatment volumes at BMP locations.

Table 12 — Potential Water Quality Storage Volumes for Widett Circle

BMP Location	Potential Storage Volume (ft^3)
Widett BMP #1	12,300
Widett BMP #2	16,300
Widett BMP #3-5	19,600
Total	**48,200**

Readville – Yard 2

As indicated in Table 2, Stormwater BMP Approaches for Widett Circle and Readville – Yard 2, stormwater BMPs would be installed at the Readville – Yard 2 site to provide 80% final TSS removal, and 44% pretreatment prior to infiltration of stormwater runoff from all proposed impervious surfaces. These BMPs could potentially be constructed at various locations within the Readville – Yard 2 site, as indicated in Table 13 and Figure 9.

A preliminary analysis was conducted to determine the water quality treatment volume necessary for full compliance with the Stormwater Management Standards. The required volume is based on the assumption that the project site has an additional 2.0 acres of impervious cover (buildings and pavement) over existing conditions. The calculated water quality volume is 7,260 cubic feet for full compliance.

2.0 acres of impervious cover
Water Quality Depth =1.0 inch per impervious acre

$$[2.0 \text{ (acre)} \times 43{,}560 \text{ (ft}^2\text{/acre)}] \times [1 \text{ (in)} / 12 \text{ (in/ft)}] = 7{,}260 \text{ ft}^3$$

Table 12 presents the potential storage volume of BMPs and compares to the required water quality volume. If permeable pavement is selected during design development, the proposed infiltration volume would be larger than the surface volumes reported in Table 13.

Table 13 — Potential Water Quality Storage Volumes for Readville – Yard 2

BMP Location	Potential Storage Volume (ft^3)
Readville BMP #1	55,000
Readville BMP #2	4,000
Total	**59,000**

2.2.5 Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs)

Standard 5 states that for land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

South Station Site

This site is considered a LUHPPL and therefore would be designed with suitable BMPs sized to treat the one-inch Water Quality Volume and provide the pretreatment requirement of 44% TSS removal prior to infiltration. See Standard 4 for a full description of the BMPs and potential storage volumes provided.

Layover Facility Sites

The layover sites are considered to be LUHPPLs and therefore would be designed with suitable BMPs sized to treat the one-inch Water Quality Volume and provide the pretreatment requirement of 44% TSS removal prior to infiltration. See Standard 4 for a full description of the BMPs and potential storage volumes provided.

2.2.6 Standard 6: Critical Areas

Standard 6 states that stormwater discharges within the Zone II or Interim Wellhead Protection Area[1] of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook.

The project sites would not discharge stormwater within a Wellhead Protection Area or near any other critical area. Therefore, all three project sites would fully comply with Standard 6.

2.2.7 Standard 7: Redevelopment Projects

Standard 7 states that a redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges would comply with Standard 1 only to the maximum extent practicable. A redevelopment project would also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

[1] Under 310 CMR 22, Zone II is the area of an aquifer, which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated. An Interim Wellhead Protection Area is a regulated area around a public well system.

South Station

As a result of the project, there would be a reduction in impervious area at the South Station site. It is therefore considered to be a redevelopment project, and would be designed to comply with Stormwater Management Standards 2-6 to the maximum extent practicable. Standards 8-10 would be met in full.

Widett Circle

As a result of the project, there would be a reduction in impervious area at the Widett Circle site. It is therefore is considered to be a redevelopment, and would be designed to comply with Stormwater Management Standards 2-6 to the maximum extent practicable. Standards 8-10 would be met in full.

Readville – Yard 2

As a result of the project there would be an increase in impervious area at the Readville – Yard 2 Site. Therefore the Readville – Yard 2 site would be designed to fully comply with all ten of the Stormwater Management Standards.

2.2.8 Standard 8: Construction - Period Pollution Prevention and Erosion and Sedimentation Controls

Standard 8 states that a plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

All three project sites would be designed to fully comply with Standard 8. All project sites would obtain coverage under the Massachusetts NPDES Construction General Permit. As required under this permit, a SWPPP would be developed and submitted before land disturbance begins. The SWPPP would include the following:

- Construction period pollution prevention measures;
- Erosion and sedimentation control plan drawings;
- Detailed drawings and specifications for erosion control BMPs, including sizing calculations;
- An operation and maintenance plan for erosion and sedimentation controls;
- An inspection schedule; and
- A maintenance schedule.

2.2.9 Standard 9: Operation and Maintenance Plan

Standard 9 states that a long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

In compliance with Standard 9, MassDOT would develop a Post Construction Stormwater Operation and Maintenance (O&M) Plan by MassDOT for all project sites, except Dorchester Avenue, during the final design. The City of Boston would develop the Post Construction Stormwater Operation and Maintenance (O&M) Plan for the Dorchester Avenue portion of the South Station site.

The O&M plan would include the following:

- Schedule for implementation of routine and non-routine maintenance tasks;
- Plan showing the location of all stormwater BMPs, and maintenance access area (if necessary);
- Party responsible for O&M; and
- O&M log form.

2.2.10 Standard 10: Prohibition of Illicit Discharges

Standard 10 states that all illicit discharges to the stormwater management system are prohibited.

All three project sites would be designed to fully comply with Standard 10. The proposed project elements would be designed to be in full compliance with current standards. Any identified illicit connections would be removed.

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SOUTH STATION
EXPANSION

Appendix B - Greenhouse Gas Analysis Documentation

June 2016

massDOT
Massachusetts Department of Transportation

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Attachment A – Building Modeling Outputs

Attachment B – Potential Emissions Savings Analysis

Attachment C – Combined Heat and Power (CHP) Sizing and Performance Estimate

Attachment D – Plug-in GHG Estimate Calculations

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1. Introduction

This appendix presents information that is used throughout Section 3.13, Greenhouse Gas Emissions Analysis, of the Final Environmental Impact Report (FEIR) for the South Station Expansion project (SSX). The information in this appendix is divided into the following four main components:

1.1. Building Modeling Outputs

The modeling outputs shown in Attachment A allow for a comparison to be made between baseline and proposed building energy use. This is also the source of the energy inputs for the Greenhouse Gas (GHG) analysis for stationary sources.

1.1. Potential Emissions Savings Analysis

This component analyzes the potential emissions savings if the project were to use the Veolia Energy System (steam), as shown in Attachment B. It is important to demonstrate a potential alternative that is still under consideration for the project based on its feasibility. This analysis provides the inputs and calculations used in the discussion of the Veolia Energy System alternative.

1.2. Combined Heat and Power (CHP) Sizing and Performance Estimate

This component analyzes the potential on-site CHP alternative and the resulting GHG impacts, as shown in Attachment C. The datasheets for a potential CHP unit are also provided in this component.

1.3. Plug-in GHG Estimate Calculations

These calculations, shown in Attachment D, demonstrate the emissions difference between idling on the diesel engine and the potential ground plug-in alternative. The data presented in this component is discussed in the transportation alternatives section for locomotive plug-ins.

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Attachment A – Building Modeling Outputs

Monthly Energy Consumption – Baseline
Monthly Energy Consumption – Proposed

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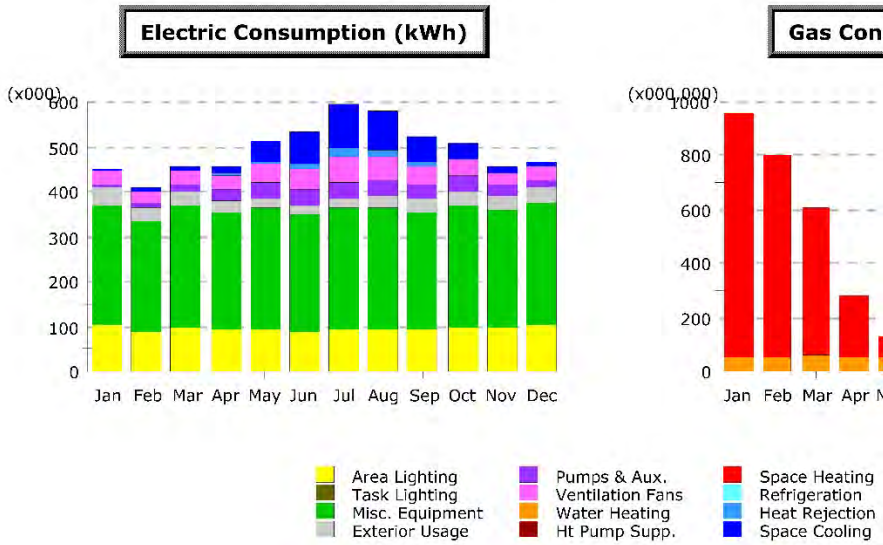

Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	5.6	6.6	9.8	19.2	45.1	68.8	97.2	84.1	57.0	32.0	14.4	10.0	449.9
Heat Reject.	0.1	0.1	0.2	0.7	4.7	10.1	18.0	14.5	7.6	2.2	0.5	0.2	58.7
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	-	-	-	-	-	-	-	-	-	-	-	-	-
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	28.0	26.1	30.1	30.9	43.0	48.3	56.3	54.3	44.2	37.4	28.3	28.9	456.1
Pumps & Aux.	10.2	11.5	17.1	27.0	32.4	33.5	36.2	35.3	32.2	31.4	22.7	16.8	306.3
Ext. Usage	36.1	30.2	30.1	25.7	23.6	21.3	22.6	25.3	27.8	32.2	34.1	36.9	345.7
Misc. Equip.	270.1	244.5	271.5	264.0	271.5	262.6	271.6	271.5	262.6	271.6	259.4	271.6	3,192.5
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	101.5	89.0	96.9	90.3	92.1	86.7	90.6	92.0	92.1	98.7	97.8	102.1	1,129.8
Total	451.6	408.0	455.7	457.9	512.3	531.2	592.4	576.9	523.6	505.5	457.3	466.5	5,939.0

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	900.8	751.2	547.8	228.7	75.1	9.7	-	1.5	8.5	107.7	387.3	722.8	3,741.2
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	53.9	51.0	56.8	52.1	50.7	43.7	40.8	39.0	37.0	40.2	45.3	48.8	559.2
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	954.7	802.2	604.6	280.8	125.7	53.4	40.8	40.5	45.5	147.9	432.6	771.7	4,300.4

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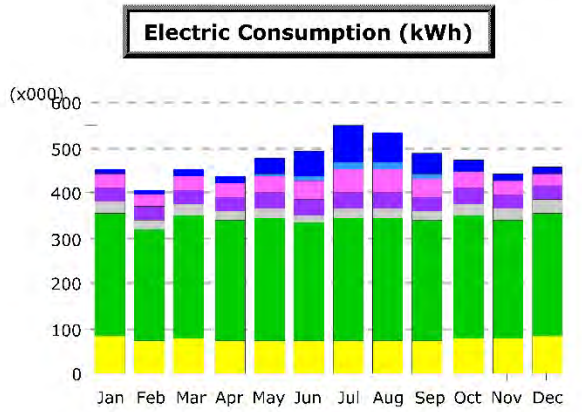

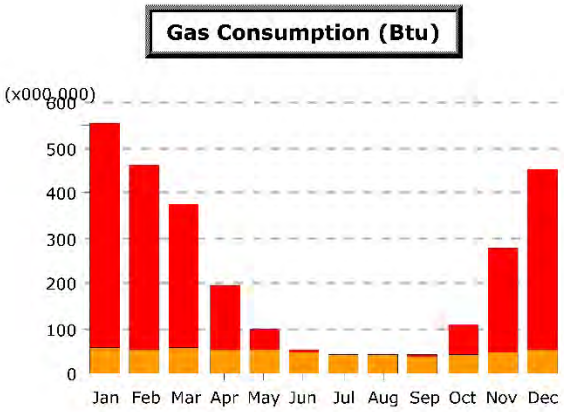

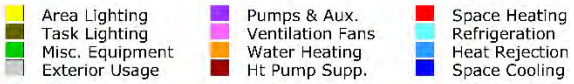

Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	12.1	11.4	14.2	18.5	36.0	55.1	80.7	69.4	45.8	26.4	15.7	14.0	399.3
Heat Reject.	0.3	0.3	0.4	1.0	4.9	9.8	17.4	14.0	7.8	2.6	0.8	0.5	59.8
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	1.2	1.0	0.9	0.5	0.2	0.0	0.0	0.0	0.0	0.2	0.7	1.0	5.7
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	27.7	25.6	29.3	30.0	40.7	45.6	52.8	51.0	41.4	35.6	27.6	28.3	435.5
Pumps & Aux.	31.0	28.1	31.6	31.3	33.4	33.2	35.8	34.8	32.7	33.0	31.0	30.8	386.7
Ext. Usage	28.9	24.2	24.1	20.6	18.9	17.0	18.1	20.2	22.2	25.7	27.3	29.5	276.8
Misc. Equip.	270.1	244.5	271.5	264.0	271.5	262.6	271.6	271.5	262.6	271.6	259.4	271.6	3,192.5
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	81.2	71.2	77.6	72.2	73.7	69.4	72.5	73.6	73.7	79.0	78.2	81.7	903.9
Total	452.5	406.2	449.6	438.1	479.2	492.7	548.9	534.5	486.2	474.2	440.8	457.3	5,660.2

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	500.3	412.0	315.3	142.0	49.2	6.2	1.7	1.6	6.2	66.8	229.6	402.5	2,133.3
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	53.9	51.0	56.8	52.1	50.7	43.7	40.8	39.0	37.0	40.2	45.4	48.8	559.3
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	554.2	463.0	372.1	194.0	99.9	49.9	42.5	40.6	43.2	107.0	274.9	451.3	2,692.6

Attachment B – Potential Emissions Savings Analysis

Veolia Steam Greenhouse Gas (GHG) Calculations

This attachment provides backup documentation for the Veolia Steam Greenhouse Gas analysis described in FEIR Section 3.13, Greenhouse Gas Emissions. The assumptions and methodologies for this analysis, as described in FEIR Section 3.13, were developed in accordance with guidance from the Department of Energy Resources (DOER) and input from Veolia.

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Convert Site gas consumption to site district steam consumption

Note (1): DS Losses = 12%; Assumed gas boiler efficiency = 93% therefore DS load = Site gas *.93* 1.12 = 1.04 Site gas.

2,712	Terminal Expansion GHG Mitigated Case, Gas Use for heating (MMBtu/year) site path
2,820	Terminal Expansion GHG Mitigated Case, Steam supplied by Veolia for heating (MMBtu/year)
1,974	Terminal Expansion GHG Mitigated Case, Steam supplied by Kendall for heating (MMBtu/year)
846	Terminal Expansion GHG Mitigated Case, Steam supplied by Kneeland for heating (MMBtu/year)

Convert all or a portion of the project as-proposed site path grid cooling electric use to steam use using the COP of the as-proposed absorption chillers.

1,363	Terminal Expansion GHG Mitigated Case, Electric Use for cooling (MMBtu/year) site path
100%	portion of cooling potentially provided by absorption chillers (preliminary for calculation purposes)
5.00	COP of electric chillers, assumed for this calculation
1.00	COP of absorption chillers, assumed for this calculation
273	Terminal Expansion GHG Mitigated Case, Steam Use for cooling (MMBtu/year) site path
245.34	Terminal Expansion GHG Mitigated Case, Steam Use for cooling (MMBtu/year) site path from Kendall
27.26	Terminal Expansion GHG Mitigated Case, Steam Use for cooling (MMBtu/year) site path from Kneeland

Subtract the site cooling transferred to the absorption chillers from the site path as-proposed grid electicity use

19,299	Terminal Expansion GHG Mitigated Case, Electric Use for all uses (MMBtu/year) site path
1,363	Terminal Expansion GHG Mitigated Case, Electric Use transferred to absorption chillers (MMBtu/year) site path
17,936	Terminal Expansion GHG Mitigated Case, Remaining Electric Use (MMBtu/year) site path

Multiply the MMBtu steam supplied to the absorption chillers by 1.12[1] and add to the steam supplied for heating.

Note (1): To account for the 12% DS distribution system losses.

245.34	Terminal Expansion GHG Mitigated Case, Steam Use for cooling (MMBtu/year) site path for Kendall
12%	District steam distribution system losses
275	Terminal Expansion GHG Mitigated Case, Steam supplied by Kendall for cooling (MMBtu/year)
1,974	Terminal Expansion GHG Mitigated Case, Steam supplied by Kendall for heating (MMBtu/year)
2,249	Terminal Expansion GHG Mitigated Case, total steam supplied by Kendall (MMBtu/year)
27.26	Terminal Expansion GHG Mitigated Case, Steam Use for cooling (MMBtu/year) site path for Kneeland
12%	District steam distribution system losses
31	Terminal Expansion GHG Mitigated Case, Steam supplied by Kneeland for cooling (MMBtu/year)
846	Terminal Expansion GHG Mitigated Case, Steam supplied by Kneeland for heating (MMBtu/year)
877	Terminal Expansion GHG Mitigated Case, total steam supplied by Kneeland (MMBtu/year)

Multiply the total steam supplied by Kendall by 1.37 (the electricity cogenerated per unit steam generated) to quantify the amount of grid energy displaced by the Kendall generation of combined heat & power district steam.

2,249	Terminal Expansion GHG Mitigated Case, total steam supplied by Kendall (MMBtu/year)
1.37	Electricity generated at Kendall Station per unit district steam generated (Mmbtu/Mmbtu)
3,081	Electricity generated at Kendall Station while generating the steam to support the Terminal Expansion GHG Mitigated case, MMBtu/year

Subtract the amount of grid energy displaced by the Kendall generation of combined heat & power district steam from the site electricity.

17,936	Terminal Expansion GHG Mitigated Case, Remaining Electric Use (MMBtu/year) site path
3,081	Electricity generated at Kendall Station while generating the steam to support the Terminal Expansion GHG Mitigated case, MMBtu/year
14,855	Terminal Expansion GHG Mitigated Case, Electric Use minus electricity generated at Kendall Station while generating steam to support the Terminal expansion GHG mitigated case (MMBtu/year) site path

Multiply the site electricity remainder by 3.01, the Site to Source Conversion Factor for grid electricity.	
14,855	Terminal Expansion GHG Mitigated Case, Electric Use minus electricity generated at Kendall Station while generating steam to support the Terminal expansion GHG mitigated case (MMBtu/year) site path
3.01	Site to Source Conversion Factor for grid electricity
44,713	Terminal Expansion GHG Mitigated Case, Electric Use minus electricity generated at Kendall Station while generating steam to support the Terminal expansion GHG mitigated case (MMBtu/year) source path

Multiply the CHP DS by 1.59 (SSFCF for CHP DS).	
2,249	Terminal Expansion GHG Mitigated Case, total steam supplied by Kendall (MMBtu/year)
1.59	Site to Source Conversion Factor for Kendall district steam
3,576	Terminal Expansion GHG Mitigated Case, total steam supplied by Kendall (MMBtu/year) source path

Multiply the CHP DS by 1.45 (SSFCF for boiler DS).	
877	Terminal Expansion GHG Mitigated Case, total steam supplied by Kneeland (MMBtu/year)
1.45	Site to Source Conversion Factor for Kneeland district steam
1,271	Terminal Expansion GHG Mitigated Case, total steam supplied by Kneeland (MMBtu/year) source path

Step 10: Add values from steps 4 and 5 together to obtain the source fuel energy.	
44,713	Terminal Expansion GHG Mitigated Case, Electric Use minus electricity generated at Kendall Station while generating steam to support the Terminal expansion GHG mitigated case (MMBtu/year) source path
3,576	Terminal Expansion GHG Mitigated Case, total steam supplied by Kendall (MMBtu/year) source path
1,271	Terminal Expansion GHG Mitigated Case, total steam supplied by Kneeland (MMBtu/year) source path
49,560	Terminal Expansion GHG Mitigated Case, total energy use (MMBtu/year) source path

Evaluate source fuel energy usage for proposed case	
2,712	Proposed Terminal Expansion GHG Site Path Gas Energy Use
19,299	Proposed Terminal Expansion GHG Site Path Electric Energy Use
1.09	SSFCF for Natural Gas
3.01	SSFCF for Electricity
2,956	Proposed Terminal Expansion GHG Source Path Gas Energy Use
58,090	Proposed Terminal Expansion GHG Source Path Electric Energy Use
61,046	Total Proposed Source Path Energy Usage

Compare source fuel energy usage for Proposed and Mitigated Case Source Path	
61,046	Total Proposed Source Path Energy Usage
49,560	Terminal Expansion GHG Mitigated Case, total energy use (MMBtu/year) source path
-18.82%	Percent Reduction in Source Path Energy Usage

Convert to GHG for Mitigated Case Site Path	
14,855	Terminal Expansion GHG Mitigated Case, Electric Use minus electricity generated at Kendall Station while generating steam to support the Terminal expansion GHG mitigated case (MMBtu/year) site path
719	lb/MWh CO2 from ISO NE reports
211	lb/MMBtu CO2 (lb/MWh converted to lb/MMBtu)
1,565	tons of CO2 from electric generation
3,126	Terminal Expansion GHG Mitigated Case, total steam supplied by Kendall + Kneeland for Site Path (MMBtu/year)
117	lb/MMBtu CO2 for steam generation
183	tons of CO2 from steam generation
1,748	tons of CO2 total from GHG Mitigated Case

Convert to GHG for Proposed Case Site Path	
19,299	Terminal Expansion GHG Mitigated Case, Electric Use minus electricity generated at Kendall Station while generating steam to support the Terminal expansion GHG mitigated case (MMBtu/year) site path
719	lb/MWh CO2 from ISO NE reports
211	lb/MMBtu CO2 (lb/MWh converted to lb/MMBtu)
2,033	tons of CO2 from electric generation
2,712	Terminal Expansion GHG Mitigated Case, total steam supplied by Veolia (MMBtu/year) site path
117	lb/MMBtu CO2 for steam generation
159	tons of CO2 from steam generation
2,192	tons of CO2 total from GHG Mitigated Case

Compare GHG for Proposed and Mitigated Case Site Path	
1,748	tons of CO2 total from GHG Mitigated Case
2,192	tons of CO2 total from GHG Mitigated Case
-20.26%	Percent Reduction in Source Path CO2 Emissions

Convert to GHG for Mitigated Case Source Path	
44,713	Terminal Expansion GHG Mitigated Case, Electric Use minus electricity generated at Kendall Station while generating steam to support the Terminal expansion GHG mitigated case (MMBtu/year) source path
726	lb/MWh CO2 from ISO NE reports
213	lb/MMBtu CO2 (lb/MWh converted to lb/MMBtu)
4,757	tons of CO2 from electric generation
3,576	Terminal Expansion GHG Mitigated Case, total steam supplied by Kendall for Source Path (MMBtu/year)
1,271	Terminal Expansion GHG Mitigated Case, total steam supplied by Kneeland for Source Path (MMBtu/year)
4,847	Terminal Expansion GHG Mitigated Case, total steam supplied by Kendall + Kneeland for Source Path (MMBtu/year)
117	lb/MMBtu CO2 for steam generation
284	tons of CO2 from steam generation
5,041	tons of CO2 total from GHG Mitigated Case

Convert to GHG for Proposed Case Site Path	
58,090	Terminal Expansion GHG Mitigated Case, Electric Use minus electricity generated at Kendall Station while generating steam to support the Terminal expansion GHG mitigated case (MMBtu/year) source path
719	lb/MWh CO2 from ISO NE reports
211	lb/MMBtu CO2 (lb/MWh converted to lb/MMBtu)
6,121	tons of CO2 from electric generation
2,956	Terminal Expansion GHG Mitigated Case, total steam supplied by Veolia (MMBtu/year) source path
117	lb/MMBtu CO2 for steam generation
173	tons of CO2 from steam generation
6,293	tons of CO2 total from GHG Mitigated Case

Compare GHG for Proposed and Mitigated Case Site Path	
5,041	tons of CO2 total from GHG Mitigated Case
6,293	tons of CO2 total from GHG Mitigated Case
-19.91%	Percent Reduction in Source Path CO2 Emissions

Summary	
Source Path Energy Comparison	
61,046	Total Proposed Source Path Energy Usage
49,560	Terminal Expansion GHG Mitigated Case, total energy use (MMBtu/year) source path
-18.82%	Percent Reduction in Source Path Energy Usage
Site Path CO2 Comparison	
2,192	tons of CO2 total from Proposed Case Site Path
1,748	tons of CO2 total from GHG Mitigated Case Site Path
-20.26%	Percent Reduction in Site Path CO2 Emissions
Source Path CO2 Comparison	
5,041	tons of CO2 total from GHG Mitigated Case
6,293	tons of CO2 total from GHG Mitigated Case
-19.91%	Percent Reduction in Source Path CO2 Emissions

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Attachment C –
Combined Heat and Power (CHP) Sizing and Performance Estimate

CHP Sizing and Performance Estimate
Potential CHP Unit Datasheets

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CHP Sizing and Performance Estimate				
SITE ENERGY USE	From eQUEST Monthly Energy Consumption in Figure 3-2			
DWH	Min.monthly Ave	41 MMBtu (July)		0.05 MMBtu/hr
CHP		The Yanmar CP10WN Micro CHP Unit is slightly oversized for this application: http://sonicchp.com/themes/sonicchp/docs/10kw-yanmar-data-sheet.pdf		
PERFORMANCE (per unit)				
	Engine output	10 kWe		Yanmar CP10WN Micro CHP Unit
	Heat input	0.12 MMBtu/hr HHV		Yanmar CP10WN Micro CHP Unit
	Thermal output	0.06 MMBtu/hr		Yanmar CP10WN Micro CHP Unit
	Heat rate	11,922 Btu/kWh HHV		calculated from above
ANNUAL ENERGY (1 unit)				
	Ann. capacity factor	90%		estimated, allows for scheduled and forced outages and some part-load operation
	Heat utilization factor	80%		estimated, allows for engine capacity factor and some thermal losses
	Grid elect. displaced	78.84 MWh/yr		
		269 MMBtu/yr		
	Fuel consumption	940 MMBtu/yr		
	Waste heat utilized	402 MMBtu/yr		
	Natural gas displaced @ 90% boiler efficiency	446 MMBtu/yr		
OVERALL THERMAL EFFICIENCY				
		MMBtu/yr		
	Fuel use	940		
	as electricity	269	29%	
	utilized heat	402	43%	
	Overall thermal efficiency		71%	accounts for heat utilization factor above
GHG EMISSIONS				
Emission Factors	Grid Electricity	726 lbs CO2/MWh		
	Natural Gas	117 lbs CO2/MMBtu		
	Fuel burned	55 tons GHG/yr		
	Grid electricity avoided	-29		
	Natural gas use avoided	-26		
	Reduction	0.3 tons GHG/yr		

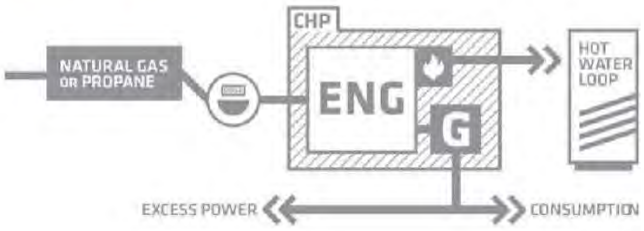
CP10WN Micro CHP Unit

The CP10WN micro CHP provides 10 kW electrical output along with recovered heat for generating hot water at rated temperature of 158 degrees (f). That output, along with a total efficiency as high as 88%, makes the CP10WN suitable for applications like nursing homes, fitness centers, health clubs, restaurants, hotels, multifamily housing units and even larger residences.

CP10WN FACTS

- High-performance, YANMAR durable gas engine
- Self Contained Radiator Package
- Quietest in its class at 54 dB(A) at 3.3 ft.
- Electrical and Thermal Outputs
- Maintenance Interval of 10,000 hours, 24/7 operation, 13 months and 3 weeks
- Black start and off grid operation capabilities
- Net metering where available
- Charmingly rectangular at 70.5"H x 57.9"W x 31.5"D
- Natural gas and Propane models available
- UL2200 Listed

CP10WN HOW



Using natural gas or propane, the CP10WN's high efficiency generator (G) provides 10kW of electrical power. The engine's thermal energy is captured and heats water at a rated temperature of 158 degrees (f) for immediate use or storage in an insulated tank. Excess electricity production can be sold back onto the grid in certain states, creating a credit.

CP10WN SPECIFICATIONS

SPECIFICATIONS				UNITS	CP10WN-SN	CP10WN-SPB
POWER	Output	Rated output [1]		kW	10.0	
		Voltage		ACV	240/120 @ 60 Hz	
		Phases/wires		-	Single phase, 3 wire	
		Power factor		%	Above 97	
	Input (Parasitic load)	Consumption	Radiator fan stopped	kW	0.39	
			Radiator fan opening	kW	0.71	
			Heater for cold region	kW	0.70	
		Voltage		ACV	240	
FUEL	Gas type			-	Natural Gas	Propane
	Consumption [5]			BTU/hr (kW)	107,500 (31.5)	112,970 (33.1)
				volume	1.08 therms/hr	1.33 gal/hr
HEAT RECOVERY [2]	Recovered Heat			BTU/hr (kW)	57,300 (16.8)	65,180 (19.1)
	Hot water temp	Inlet		°F (°C)	149 (65)	
		Outlet		°F (°C)	158 (70) Max. 172 (78)	
	Hot water flow rate [3]			gal/min (L/min)	12.7 (48.2)	
EFFICIENCY [2]	Overall efficiency			%	85.0	88.0
	Electrical generation efficiency			%	31.5	30.0
	Exhaust heat recovery ratio			%	53.5	58.0
SOUND LEVEL	For rated load [4]		Radiator fan stopped	dB(A)	54	
			Radiator fan operating	dB(A)	56	
DIMENSIONS	Width			in. (mm)	57.9 (1,470)	
	Depth [6]			in. (mm)	31.5 (800)	
	Height			in. (mm)	70.5 (1,790)	
	Net weight [7]			lb (kg)	1664 (756)	

1 Parasitic loads are included.
2 The heat recovery and efficiency values are those for rated output in standard atmospheric conditions.
3 Maximum of 5%: 13.3 gal/min (50.6 L/min)
4 The sound levels are maximum values measured in four directions at a distances of 3.3 ft (1.0 m).
5 The amount of fuel consumption based on lower calorific values.
6 Depth 35.4 in. (900mm) including protrusions.
7 Including coolant and engine oil.

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Attachment D – Plug-in GHG Estimate Calculations

Plug-in GHG Estimate Calculations

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Mobile source emissions analysis revision to account for indirect electrical use associated with the proposed plug-in facilities at South Station and the layover sites.

Draft
Epsilon 11/24/2015

Factors:

14.3 kW average power load of fleet average coach in layover mode

39.8 kW electrical load for a typical locomotive in layover mode (totaled from individual loads)
From Keolis Annual Engineering Service Plan, 5/1/2015, Section 9.12.5

726 lb CO2/MWhr annual average system emission rate
From DRAFT 2014 ISO New England Electric Generator Air Emissions Report, Table 1-1

39.6 gallon/hour fuel consumption rate
From Emission Factors for Locomotives, Office of Transportation and Air Quality, 2009. EPA-420-F09-025 PAGE 5 (Consistent with calculations in SSX DEIR Appendix 12 Attachment E)

10,217 g CO2/gallon fuel
Consistent with SSX DEIR Appendix 12 Attachment E - Layover Locomotives CO2 Emissions

Inputs:

304 Number of coaches in layover mode per day
Based on 38 trains/day per SSX DEIR Appendix 12 Attachment E, 8 coaches per train

38 Number of locomotives in layover mode per day
Consistent with calculations in SSX DEIR Appendix 12 Attachment E for Widett & Readville 2 net

3.5 Hours per day in layover mode
Note: actual layover is 4.5 hours but 1 hour is spent idling on oil regardless of plug in so there is no difference for that hour

365 Days/year
Consistent with calculations in SSX DEIR Appendix 12 Attachment E
Note: that this is a high estimate of all 365 days being equal, in reality weekend service will be reduced

Outputs:

5,554 MWhr/year electric load from coaches plugged in at ground power receptacles

1,932 MWhr/year electric load from locomotives plugged in at ground power receptacles

7,486 MWhr/year electric load total plugged in at ground power receptacles

2,717 Tons CO2/year indirect emissions from electric use associated with trains plugged in at ground power receptacles

1,922,382 gallons fuel/year from baseline case train idling

21,650 Tons CO2/year baseline case direct emissions from diesel use associated with trains idling

18,933 Tons CO2/year improvement from electric use associated with trains plugged in at ground power receptacles

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SOUTH STATION
EXPANSION

Appendix C-1 Site Specific Health and Safety Plan – South Station

June 2016

massDOT
Massachusetts Department of Transportation

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Site Specific Health and Safety Plan – South Station

TBD

Designated Health and Safety (H&S) Plan Writer

TBD

Designated Health and Safety (H&S) Plan Reviewer

TBD

Project Manager

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Forward

The following Health and Safety Plan (HASP) has been prepared in accordance with the Occupational Safety and Health Administration's (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard, 29 CFR 1910.120. This HASP is applicable to the future Phase II Environmental Site Assessment (ESA) activities planned for South Station site. At the time of preparation of this HASP, a Phase II ESA Scope of Work (SOW) has not been prepared for the site. Therefore, there are several sections of the following HASP that will require review once the Phase II ESA SOW is finalized. The sections requiring potential revisions are identified in the text of the HASP and include, but are not limited to, emergency contact information, job safety analyses, personnel exposure monitoring, and client specific health and safety (H&S) requirements.

1. Introduction

This HASP has been prepared for the Phase II ESA work planned for South Station located at 700 Atlantic Avenue in Boston, Massachusetts. The work on this project will be carried out in compliance with Contractor's H&S Standards, and the Occupational Safety and Health Administration's (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) regulation. Specific H&S information for the project is contained in this HASP. All personnel working on hazardous operations or in the area of hazardous operations shall read and be familiar with this HASP before doing any work. All project personnel shall sign the certification page acknowledging that they have read and understand this HASP.

Changes in the scope of the project or introduction of new hazards to the project shall require revision of the HASP by the HASP writer and reviewer, and approval by the Project Manager (PM). The HASP Addendum Form and Log Table are included as Attachment A.

2. Emergency Contact Information and Procedures

Table 1 presents the Emergency Contact Information associated with the planned Phase II ESA work. List the appropriate Contractor PM, Contractor H&S Manager, and Client H&S Contact once they have been identified. The information in Table 1 should be revised, if necessary, upon review of the Phase II ESA SOW and prior to initializing the Phase II ESA activities.

Table 1 — Emergency Contact Information

Contact	Contact Information
Local Police – Boston Police	911 and 617-343-4730
MBTA Transit Police	617-222-1212
Local Ambulance – Boston Fire Department	911 and 617-343-3415
Local Fire Department – Boston Fire Department	911 and 617-343-3415
Local Hospital: Tufts Medical Center	617-636-5566
Local Weather Data	Weather.com
Poison Control	800-332-3073
National Response Center (all spills in reportable quantities)	800-424-8802
U.S. Coast Guard (spills to water)	800-424-8802
Team PM	TBD
Team H&S Manager	TBD
Client H&S Contact	TBD

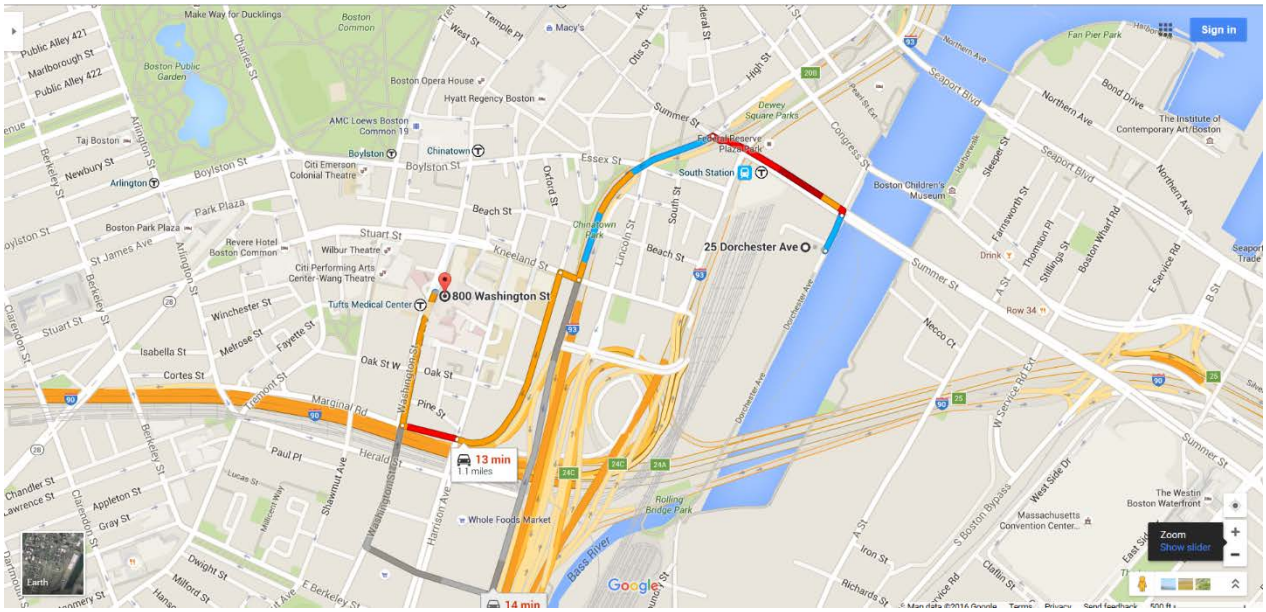
Table 2 presents the location of and directions to the nearest hospital with emergency medicine capabilities should transportation be required during the completion of the Phase II ESA work (see Figure 1). The information in Table 2 should be revised, if necessary, upon review of the Phase II SOW and prior to initializing the Phase II ESA activities.

Table 2 —Hospital Location and Directions

Medical Facility	Tufts Medical Center
Address	800 Washington Street, Boston, MA 02111
Phone Number	617-636-5000

1. Head northeast on Dorchester Avenue toward Summer Street.
2. Turn left onto Summer Street
3. Use the left 2 lanes to turn left onto John F Fitzgerald Surface Road/Surface Road for 0.3 miles.
4. Turn right onto Kneeland Street.
5. Turn left at the 1st cross street onto Hudson Street for 0.3 miles.
6. Continue onto Marginal Road.
7. Turn right onto Washington Street, Tufts Medical Center.
8. Your destination, 800 Washington Street, Boston MA 02111 is on the right.

Figure 1 – Hospital Route



2.1 Emergency Notification Procedure for the Project

1. Dial 911 (if necessary).
2. Contact Project Manager (PM)/Task Manager (TM).
3. Contact Team H&S Coordinator.
4. Contact Client H&S Contact.

2.2 Emergency Supplies and Equipment List

Table 3 presents the appropriate Emergency Supplies and Equipment List for the planned Phase II ESA work. Select the appropriate supplies and equipment based on the proposed work. The information in Table 3 should be revised, if necessary, upon review of the Phase II SOW and prior to initializing the Phase II ESA activities.

Table 3 — Emergency Supplies and Equipment List

Emergency Supplies and Equipment (check all that apply)	Location on Project Site
☒ First Aid Kit (type):	TBD
☒ Fire Extinguisher	TBD
☒ Mobile Phone ☐ Satellite Phone	TBD
☒ Traffic Cones	TBD
☐ Walkie Talkies	
☐ Water or Other Fluid Replenishment	
☐ Eye Wash/Quick Drench Station	
☒ Eye Wash Bottle	TBD
☐ Wash and Dry Towelettes	
☐ Sunscreen (SPF 15 or higher)	
☐ Insect Repellant	
☒ Chemical Spill Kit	TBD
☐ *Other (specify):*	

3. Project and Site History Requirements

3.1 Site Background

The South Station Terminal is currently Boston's largest transit hub. The property has been in use as a railroad center since 1867. A coal storage area was present on the site at that time. The property became a transit hub for the Massachusetts Bay Transportation Authority (MBTA) when the public transportation service first opened in the 1920s.

3.2 Site Description

The approximately 49-acre South Station site currently includes the following: South Station Rail/Transit Terminal; South Station Bus Terminal; and U.S. Postal Service (USPS) General Mail Facility (GMF)/South Postal Annex, including that portion of Dorchester Avenue fronting the site and running parallel to Fort Point Channel. The existing South Station Terminal area currently consists of 13 tracks, eight platforms, and a system of trackwork (also referred to as interlockings).

Table 4 lists various site types that may have an effect on HASP requirements for the planned Phase II ESA work. Select the appropriate characteristics for the site.

Table 4 — Site Type

X	Active	X	Secure		Industrial		Landfill		Service station
	Inactive	X	Unsecured		Commercial		Well field		Water work
			Uncontrolled		Residential	X	Railroad		Undeveloped
Other specify:									

Based on the completion of a Phase I ESA, several potential Chemicals of Concern (COCs) were identified. These primary COCs include, but may not be limited to, those listed in Table 5.

Table 5 — Primary Chemicals of Concern

Known Compounds	Source (soil/water/drum, etc.)	Known Concentration Range (ppm, mg/kg, mg/l)	
		Lowest	Highest
Polychlorinated biphenyls (PCBs)	Soil	unknown	unknown
Volatile Petroleum Hydrocarbons	Soil/Water	unknown	unknown
Extractable Petroleum Hydrocarbons	Soil/Water	unknown	unknown
Volatile Organic Compounds	Soil/Water	unknown	unknown
Polyaromatic Hydrocarbons	Soil/Water	unknown	unknown
Metals	Soil	unknown	unknown

3.3 List of Project Tasks and Phase II Scope of Work

1. Task 1 – Subsurface Investigation: Prior to completion of the subsurface investigation activities, a ground penetrating radar survey will be completed.
2. Task 2 – Soil Sampling: A soil sampling program will be conducted to determine the extent of potential impacts at the site. Samples will be obtained via Geoprobe® sampling techniques. Specific safety issues related to Geoprobe or other drilling techniques will be addressed in the Job Safety Analysis (JSA), a sample of which can be found in Attachment B.
3. Task 3 – Groundwater Sampling: An evaluation of the groundwater conditions at the site will include the surveying, gauging, and sampling of monitor wells.

4. Contractor Organization and Responsibilities

4.1 All Personnel

Each person is responsible for completing tasks safely, and reporting any unsafe acts or conditions to their supervisor. No person may work in a manner which conflicts with these procedures. Prior to initiating site activities, all Contractor and subcontractor personnel will receive training in accordance with applicable regulations, and be familiar with the requirements and standards referenced in this HASP. In addition, all personnel will attend daily safety meetings (tailgate meetings) to discuss site-specific hazards prior to beginning each day's work. Every Contractor employee, subcontractor, and client representative at the site has the responsibility and authority to **Stop Work** of a coworker or subcontractor if the working conditions or behaviors are considered unsafe by them. When a **Stop Work** occurs, a review of the concerns should be conducted by the crew involved. Should the crew involved not be able to address the **Stop Work** concerns, the Site Safety Officer should be notified to review the conditions. There is no required period of down time for a **Stop Work** and work can commence once the conditions have been reviewed and addressed if necessary.

4.2 Project Manager/Task Manager

The PM is responsible for verifying that project activities are completed in accordance with the requirements of this HASP. The TM is the person generally responsible for the implementation of the field activities and safety on the project site. The PM is responsible for confirming that the project has the equipment, materials,

and qualified personnel to fully implement the safety requirements of this HASP, and/or that subcontractors assigned to this project, meet the requirements established by the Contractor. It is also the responsibility of the PM to:

- Review all applicable H&S Standards, and ensure that project activities conform to all requirements;
- Obtain client-specific H&S information and communicate with the client on H&S issues;
- Communicate with the Site Safety Officer (SSO) on H&S issues;
- Allocate resources for correction of identified unsafe work conditions;
- Ensure the Contractor's site workers have all training necessary for the project; and
- Report all injuries, illnesses and near-misses to the client representative, lead incident investigations, and ensure that any recommendations made are implemented.

4.3 Site Safety Officer

The Site Safety Officer (SSO) has overall responsibility for the technical H&S aspects of the project. Inquiries regarding the Contractor's H&S standards, project procedures, and other technical or regulatory issues should be addressed to this individual. It is also the responsibility of the SSO to:

- Review and work in accordance with the components of this HASP;
- Ensure that this HASP is available to and reviewed by all site personnel including subcontractors;
- Ensure that necessary site-specific training is performed (both initial and "tailgate" safety briefings);
- Ensure site visitors have been informed of the hazards related to the Contractors work;
- Ensure that work is performed in a safe manner and has authority to stop work when necessary to protect workers and/or the public;
- Coordinate activities during emergency situations;
- Ensure that all necessary permits and safety information provided by the client is disseminated to other site personnel and is maintained in an organized manner;
- Communicate with the PM on H&S issues;
- Report all injuries, illnesses and near-misses to the PM;
- Ensure that necessary safety equipment is maintained and used at the site; and
- Contact an H&S professional for assistance in establishing the respiratory cartridge change schedule as required.

An individual can act as more than one role, PM, TM, and/or SSO, during field activities.

5. Project Hazards and Control Measures

5.1 Hazard Analysis

The hazards in the Table 6 below must be ranked using HIGH (H), MEDIUM (M) or LOW (L) based on current site knowledge and Figure 2. For hazards that are not applicable, leave blank. Use the results of this analysis to verify that controls in the Job Safety Analysis (JSA) or other supporting documents are adequate to mitigate task hazards. When in the field, use the Tailgate Safety Meeting Form for task specific evaluation of task hazards.

Table 6 provides various potential hazardous associated with the site, seasonal conditions, and proposed activities for the planned Phase II ESA work. Select the appropriate hazards and the appropriate severity based on the probability and severity of the risks based on the proposed work. The information in Table 6 should be revised, if necessary, upon review of the Phase II SOW and prior to initializing the Phase II ESA activities.

Table 6 should be reviewed and approved by the SSO at least every six months or any time site conditions or activities change from the original scope of work associated with this HASP.

Figure 2 — Hazard Ranking Chart

Severity	Consequence		Probability				
	Property Damage	Injury	Frequent	Likely	Occasional	Seldom	Unlikely
	> $100,000	Fatality	H	H	H	H	M
	> $10,000	Injury Requiring Hospitalization	H	H	H	M	L
	> $1000	Injury Requiring Medical Treatment Beyond First Aid	H	M	M	L	L
	< $1000	Injury Requiring First Aid	M	L	L	L	L

Table 6 — Hazard Rankings

Biological		**Mechanical**		**Chemical/Radiation**	
L	Biting/stinging insects	L	Cuts on equipment/tools		
L	Biting animals	M	Pinch points on equipment	L	General
L	Poisonous plants	L	Burns from equipment	H	Dusts, toxic
L	Phys. damaging plants	L	Struck by equipment	L	Dusts, nuisance
				L	Chemicals, Contractor use
Driving		**Motion**		L	Chemicals, corrosive
L	Night driving	L	Lifting/awkward body positions		Chemicals, explosive
M	Off-road driving	H	Struck by vehicle/traffic		Chemicals, flammable
L	Urban driving				Chemicals, oxidizing
	All-terrain vehicle	**Personal Safety**		M	Chemicals, toxic
	Boat		Working late/night		Chemicals, reactive
			Working alone		Radiation, ionizing
Electrical			High crime area		Radiation, non-ionizing
	Wet environments				
L	Electrical panels	**Pressure**		**Compound Specific**	
L	Electric utilities	M	Utilities (gas, water, etc.)	M	Asbestos
	Electric power tools		Compressed gas cylinders	L	Benzene
			Compressed air/aerosols		Cadmium
Environment		M	Hydraulic systems		Hydrogen sulfide
L	Heat			M	Lead
L	Cold	**Sound**			Silica
	Lightning	L	Equipment noise		
	Inclement weather		Tool noise	**Gravity**	
	High wind	L	Traffic noise vehicle/train/etc.)	M	Slip, trip, fall
					Fall from height
					Ladders or scaffolds
					Struck by falling object

5.2 Job Safety Analyses, Health and Safety Standards, and Personal Protective Equipment

Site specific Job Safety Analyses (JSAs) will be completed for each safety critical task, and should be included in Attachment B. Hazards identified in the table above will be addressed specifically in the JSAs as well as control methods to protect employees and property from hazards. The JSA must lists the type of Personnel Protective Equipment (PPE) required for the completion of the project.

- Level D protection is the minimum protection required. Appropriate Level D protective equipment may include: Gloves, coveralls, safety glasses, face shield, and chemical-resistant, steel-toe shoes.
- Level C protection is required when the concentration and type of airborne substances is known and the criteria for using air purifying respirators are met. Typical Level C equipment may include: full-face air purifying respirators, inner and outer chemical-resistant gloves, hard hat, escape mask, and disposable chemical-resistant outer boots.
- Level B protection is required under circumstances requiring the highest level of respiratory protection, with lesser level of skin protection. Examples of Level B protection include: positive pressure, full face-piece self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA; inner and outer chemical-resistant gloves; face shield; hooded chemical resistant clothing; coveralls; and outer chemical-resistant boots.
- Level A protection is required when the greatest potential for exposure to hazards exists, and when the greatest level of skin, respiratory, and eye protection is required. Examples of Level A clothing and equipment include: positive pressure, full face-piece SCBA or positive pressure supplied air respirator with escape SCBA; totally encapsulated chemical- and vapor-protective suit; inner and outer chemical-resistant gloves; and disposable protective suit, gloves, and boots.

A detailed list of PPE for the project is located in Attachment C.

Items for which the Contractor should have H&S Standards for this project are listed below. These standards should be reviewed by the PM, TM and site personnel. Prior to initializing the Phase II ESA SOW the potential for client specific JSAs, H&S standards, and PPE requirements need to be reviewed. The Client H&S Contact should be contacted with any questions concerning the client specific standards, including:

- Utility Location;
- Drilling, Excavation and Trenching;
- Benzene;
- Asbestos;
- Polychlorinated biphenyls (PCBs); and/or
- Lead.

6. Hazard Communication

All project required chemicals must be handled in accordance with the Contractor's Standard. The table below lists all chemicals that will be brought, used, and/or stored on the site by Contractor's and/or its subcontractors. Material Safety Data Sheets (MSDS) for chemicals brought on site are included in Attachment D. In Table 7 below, list the chemicals anticipated to be used by the Contractor on this project subject to Hazard Communication (HazCom) requirements. Modify quantities as needed.

Table 7 provides a list of various chemicals that may be used on site during the activities for the planned Phase II ESA work. Select the appropriate on-site chemicals based on the proposed work and the expected

quantities to be onsite. The information in Table 7 should be revised, if necessary, upon review of the Phase II SOW and prior to initializing the Phase II ESA activities. This list should be updated when any new chemicals are brought to the site and reviewed every six months during the project to ensure its accuracy.

Table 7 — On-Site Chemicals

	Acids/Bases	Qty.		Decontamination	Qty.		Calibration	Qty.
☐	Not applicable		☐	Not applicable		☐	Not applicable	
☐	Hydrochloric acid		☐	Alconox		☐	Isobutylene/air	
☐	Nitric acid		☐	Liquinox		☐	Methane/air	
☐	Sulfuric acid		☐	Acetone		☐	Pentane/air	
☐	Sodium hydroxide		☐	Methanol		☐	Hydrogen/air	
☐	Zinc acetate		☐	Hexane		☐	Propane/air	
☐	Ascorbic acid		☐	Isopropyl alcohol		☐	Hydrogen sulfide/air	
☐	Acetic acid		☐	Nitric acid		☐	Carbon monoxide/air	
☐	Other:		☐	Other:		☐	pH standards (4,7,10)	
						☐	Conductivity standards	
						☐	Other:	
	Fuels	**Qty.**		**Kits**	**Qty.**			
☐	Not applicable		☐	Not applicable				
☐	Gasoline		☐	Hach			Specify:	
☐	Diesel		☐	DTECH			Specify:	
☐	Kerosene		☐	EPA 5035 Soil			Specify:	
☐	Propane		☐	Other:				
☐	Other:							
	Remediation	**Qty.**					**Other:**	**Qty.**
☐	Not applicable					☐	Not applicable	
☐	Other:					☐	Spray paint	
☐	Other:					☐	WD-40	
☐	Other:					☐	Pipe cement	
☐	Other:					☐	Pipe primer	
☐	Other:					☐	Mineral spirits	

7. Chemical Hazards

As required, air monitoring will be conducted and as outlined in this HASP to collect exposure data for COCs or for chemicals brought onsite for use. Table 8 lists the properties of chemicals that will be encountered at the site.

Table 8 — Chemical Hazard Information

Chemical Name	IP (eV)	Routes of Entry/ Exposure Symptoms	8-hr TWA[a] (ppm)	IDLH[b] (NIOSH) (ppm)	STEL (ppm)	Source TLV/PEL
Lead	NA	inhalation	.05 mg/m^3	100 mg /m^3 (as Pb)	Not Listed	.05 mg/m^3

NA – Not Applicable

[a] The Threshold Limit Value (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH) is listed unless the Permissible Exposure Limit (PEL), designated by OSHA, is lower.

[b] Immediately Dangerous To Life or Health (IDLH) per the National Institute for Occupational Safety and Health (NIOSH).

See Section 9 for information on air monitoring requirements.

8. Tailgate Meetings

Tailgate safety briefings must be conducted at least once daily and should be conducted twice daily (at the start of the job and after midday meal break), or as tasks/hazards change. Each tailgate safety briefing must be documented on the form included in Attachment E and maintained with the project files. The tailgate safety briefing will serve as a final review for JSAs, hazard identification and controls to be utilized.

9. Personal Exposure Monitoring and Respiratory Protection

This section has been provided should personal exposure monitoring and respiratory protection be required. Based on the final Phase II SOW, the Team H&S Manager will determine the necessity of this section. This determination is to be conducted prior to implementing the Phase II ESA SOW.

Personal and area exposure monitoring will be documented on the Real Time Exposure Monitoring Data Form provided in Attachment E. All monitoring equipment will be maintained and calibrated in accordance with manufacturer's recommendations. All pertinent monitoring data will be logged on the form and maintained on site for the duration of project activities. Calibration of all monitoring equipment will be conducted daily and logged on the same form.

Table 9 — Exposure Monitoring Requirements

TASK 1 – Is exposure monitoring required for the completion of this task? ☐ YES ☐ NO If yes, complete the following:				
Exposure Hazard	**Monitoring Equipment**	**Monitoring Frequency**	**Action Level**	**Required Action**
TBD				
TASK 2 – Is exposure monitoring required for the completion of this task? ☐ YES ☐ NO If yes, complete the following:				
Exposure Hazard	**Monitoring Equipment**	**Monitoring Frequency**	**Action Level**	**Required Action**
TBD				
TASK 3 – Is exposure monitoring required for the completion of this task? ☐ YES ☐ NO If yes, complete the following:				
Exposure Hazard	**Monitoring Equipment**	**Monitoring Frequency**	**Action Level**	**Required Action**
TBD				

Table 9 lists exposure monitoring requirements and associated action levels for site exposure hazards (e.g. chemical, noise, radiation, etc.). Action levels have been developed for exposure monitoring with real-time air monitoring instruments as specified in the table. Air monitoring data will determine the required respiratory protection levels at the Site during scheduled intrusive activities. The action levels are based on sustained readings indicated by the instrument(s). Air monitoring will be performed and recorded at up to 30-minute intervals.

If elevated concentrations are indicated, the monitoring frequency will be increased, as appropriate. If sustained measurements are observed during this time, the following actions will be instituted, and the PM and Project H&S Manager will be notified. For purposes of this HASP, sustained readings are defined as the average airborne concentration maintained for a period of one (1) minute.

9.1 Respirator Cartridge Change Schedule

Respirators will be stored in clean containers (i.e., self-sealing bag) when not in use. If respirators are required to be worn based on the action levels established above, respirator cartridges will be replaced in accordance with the following change-out schedule provided in Table 10.

Table 10 — Respirator Cartridge Change Schedule

Type of Cartridge	Cartridge Change-out Schedule
Particulate (i.e., High Efficiency Particulate Air)	At least weekly or whenever the employee detects an increase in breathing resistance. This will occur as the filter becomes loaded with particulate matter.
Sorbent (i.e., organic vapor)	At the end of each day's use or sooner, if the respirator manufacturer change-out schedule software program dictates otherwise. The Project H&S Manager or the PM must be consulted regarding gas/vapor cartridge change-out schedule. This will be determined per the Contractors Respiratory Protection standard.

Personnel who wear air purifying respirators (APRs) must be trained in their use, must have successfully passed a qualitative respiratory fit test within the last 12 months, and must have medical clearance for APR use.

With the exception of protection against particulates[1], if the action plan outlined above calls for an upgrade to an air-purifying respirator (for protection against organic vapors and other gaseous chemicals), the following will apply:

- The respirator cartridge will be equipped with an end-of-service-life indicator (ESLI) certified by National Institute for Occupational Safety and Health (NIOSH) for the contaminant; or
- If there is no ESLI appropriate for a contaminant, the project will implement a change schedule for cartridges to ensure that they are changed before the end of their service life.

10. Medical Surveillance

Medical surveillance requirements are outlined in the Contractor Medical Monitoring Standard. All medical surveillance requirements as indicated must be completed and site personnel medically cleared before being permitted on the project site.

[1] Cartridge Change Schedule is not necessary for cartridges used in the protection against particulates provided that the cartridges are changed out when there is a perceived resistance in breathing experienced by the user.

11. General Site Access and Control

The SSO will coordinate access and control security at the work site. As the work dictates, the SSO will establish a work area perimeter. The size of the perimeter will be based on the daily task activities and will be discussed with all project personnel during the tailgate meeting and then documented on the tailgate meeting form. Control zones for Level C or above, as described previously, will be demarcated by either visual or physical devices and will be monitored for effectiveness by the SSO.

Only authorized personnel will be allowed beyond the perimeter. Other site workers and visitors to the site should be kept out of the work site. If visitors need access to the site, the SSO will escort the visitor at all times. All visitors will log in and out with the SSO. The visitor log sheet is included in Attachment F.

11.1 Sanitation at Temporary Workplaces

11.1.1 Potable Water

An adequate supply of potable water must be provided on the site. Portable containers used to dispense drinking water shall be capable of being tightly closed, and equipped with a tap. Water shall not be dipped from containers. Any container used to distribute drinking water shall be clearly marked as to the nature of its contents and not used for any other purpose. Where single service cups (to be used but once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.

Potable water is available at facilities on site.

11.1.2 Toilet Facilities

Under temporary field conditions, the SSO will make provisions so that no less than one toilet facility is available. Use of a nearby toilet facility is an acceptable arrangement for mobile crews having transportation readily available.

Restroom facilities are available on site.

12. Decontamination Control Zones and Procedures

This section has been provided should decontamination control zones and procedures for Level C or higher be required. Based on the final Phase II SOW, the Team H&S Manager will determine the necessity of this section and make appropriate revisions. This determination is to be conducted prior to implementing the Phase II ESA SOW.

The zones for Level C and above will be designated by traffic cones, barricades, signs, caution tape, or other means effective in identifying the different areas. The SSO will establish control boundaries for the exclusion zone, contamination reduction zone, and the support zone. The zones will be identified by the SSO during tailgate meetings and documented on the meeting form. Entrance and exit to the exclusion zone will only be through controlled access points established for each work area.

Table 11 presents the Level A and B decontamination procedures.

Table 11 — Level A/B Decontamination Steps

Level A Decontamination Steps		Level B Decontamination Steps	
EZ-1	Segregated Equipment Drop	EZ-1	Segregated Equipment Drop
EZ-2	Boot Cover and Glove Wash	EZ-2	Boot Cover and Glove Wash
EZ-3	Boot Cover and Glove Rinse	EZ-3	Boot Cover and Glove Rinse
EZ-4	Tape Removal	EZ-4	Tape Removal
EZ-5	Boot Cover Removal	EZ-5	Boot Cover Removal
EZ-6	Outer Glove Removal	EZ-6	Outer Glove Removal
CRZ-7	Suit/Safety Boot Wash	CRZ-7	Outer Glove Removal
CRZ-8	Suit/Safety Boot Rinse	CRZ-8	Suit/SCBA/Boot/Glove Rinse
CRZ-9	Encapsulated Suit Partial Removal/Tank Change	CRZ-9	Tank Change
CRZ-9a	Redress-return to EZ	CRZ-9a	Redress-return to EZ
CRZ-10	Safety Boot Removal	CRZ-10	Safety Boot Removal
CRZ-11	Encapsulated Suit Removal	CRZ-11	SCBA Removal
CRZ-12	SCBA Removal	CRZ-12	Splash Suit Removal
CRZ-13	Inner Glove Wash	CRZ-13	Inner Glove Wash
CRZ-14	Inner Glove Rinse	CRZ-14	Inner Glove Rinse
CRZ-15	Face-piece Removal	CRZ-15	Face-piece Removal
CRZ-16	Inner Glove Removal	CRZ-16	Inner Glove Removal
CRZ-17	Inner Clothing Removal	CRZ-17	Inner Clothing Removal
SZ-18	Field Wash	SZ-18	Field Wash
SZ-19	Redress	SZ-19	Redress

Zones include:

- EZ-Exclusion Zone – The area of investigation or contamination. No personnel allowed unless appropriate PPE is worn;
- CRZ-Contamination Reduction Zone – The transition area of between contaminated areas and the support zone. Decontamination activities are conducted here; and
- SZ-Support Zone – Non-contaminated areas outside the work zone.

13. Emergency Action Plan

An Emergency Action Plan (EAP) will be prepared and approved by the SSO. The EAP will be included in Attachment G. The EAP details the procedures to take in the event that an injury, over-exposure or spill has occurred. The EAP must be approved by the SSO and reviewed by site personnel working under this HASP. All employees working on this project must be shown the location and proper use of all emergency equipment prior to beginning work on the project.

14. Client-Specific Health and Safety Requirements

Prior to implementing the Phase II ESA, the Team H&S Manager should verify if the client has specific H&S requirements that apply to the proposed work. If the client has requirements they should be listed and defined in this section, otherwise thus section can be removed.

Contractor project personnel must comply with the client's specific H&S requirements at all times. Client-specific H&S requirements are as follows:

- (list requirements here)

15. Ground or Air Shipments of Hazardous Materials

All samples, electronic equipment with batteries, powders, gases, liquids, magnetized materials or radioactive materials being shipped by air or ground transport will be evaluated using the appropriate Shipping Determination process to determine if the material or equipment being shipped is hazardous for transport. All materials identified as hazardous materials (HazMat) will be shipped according to applicable MassDOT and International Air Transport Association (IATA) regulations and requirements as prescribed by the Contractor DOT Program.

All employees collecting samples, preparing HazMat packages, or offering HazMat to a 3rd party carrier such as FedEx will have current HazMat training.

16. H&S Orientation and Task Improvement Process

As part of any project, no matter how simple or complex, Task Improvement Processes (TIPs) should be conducted when practical and when able to integrate into normal business activities. TIPs should be scheduled based on the risk of the tasks being performed, and should be conducted for different tasks and at different times. Completion of TIPs should be documented on the tailgate meeting form. The following table should be filled out upon completion of TIPs conducted on this project.

Table 12 — TIP Plan

Identified Task for TIP	Schedule Date	Observer Name	Observee Name	Feedback Supervisor Name

17. Subcontractors

A copy of this HASP is to be provided to all subcontractors prior to the start of work so that the subcontractor is informed of the hazards at the site. While the Contractor HASP will be the minimum H&S requirements for the work completed by Contractor and its subcontractors, each subcontractor, in coordination with Contractor H&S personnel, is expected to perform its operations in accordance with its own HASP, policies and procedures unique to the subcontractor's work to ensure that hazards associated with the performance of the work activities are properly controlled. Copies of any required safety documentation for a subcontractor's work activities will be provided to Contractor for review prior to the start of on-site activities.

In the event that the subcontractor's procedures/requirements conflict with requirements specified in this HASP, the more stringent guidance will be adopted after discussion and agreement between the subcontractor and Contractor project H&S personnel. Hazards not listed in this HASP, but known to the subcontractor or known to be associated with the subcontractor's services, must be identified and addressed to the Contractor PM or TM and SSO prior to beginning work operations.

Should Subcontractors working at the site choose to utilize this HASP they will need to have this plan with them, and will also need to sign the Subcontractor HASP receipt signature page of the Contractor HASP (Attachment H). Subcontractors are responsible for the H&S of their employees at all times, and have the authority to **Stop Work** if unsafe conditions arise.

The PM/TM and SSO (or authorized representative) has the authority to halt the subcontractor's operations and to remove the subcontractor or subcontractor's employee(s) from the site for failure to comply with established H&S procedures or for operating in an unsafe manner.

18. Project Personnel HASP Certification

All site project personnel will sign the certification signature page provided in Attachment H of this HASP.

19. Roadway Work Zone Safety

All project work performed in a public or private roadway, regardless of work duration, will require a either a written Traffic Control Plan (TCP) or a Construction Management Plan (CMP). Projects having work activities on both public and private roadways will operate under a TCP approved by an employee designated with Engineering Judgment. A site specific TCP and/or CMP have been prepared for the site and work conducted as part of the Phase II Scope of Work will conform to them.

Attachment A – Health and Safety Plan (HASP) Addendum and Log Table

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Addendum Page

This form should be completed for new tasks associated with the project. The PM and/or TM should revise the Project Hazard Analysis Worksheet with the new task information and attach to this addendum sheet. JSAs should be developed for any new tasks and attached as well.

Review the addendum with all site staff, including subcontractors, during the daily tailgate briefing, and complete the tailgate briefing form as required. Attach a copy of the addendum to all copies of the HASP including the site copy, and log in the Addendum Log Table A-1 on the next page.

Addendum Number: _____ Project Number: _____

Date of Changed Conditions: _____ Date of Addendum: _____

Description of Change that Results in Modifications to HASP:

Signed: _____ Signed: _____
Project Manager Site Safety Officer

Signed: _____ Signed: _____
H&S Plan Writer H&S Plan Reviewer

Addendum Log Table

Addendums are to be added to every copy of the HASP, and logged on Table A-1 to verify that all copies of the HASP are current:

Table A-1— Addendum Log Table

Addendum Number	Date of Addendum	Reason for Addendum	Person Completing Addendum
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Attachment B – Job Safety Analysis (JSAs)

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Table B1 - Job Safety Analysis - **EXAMPLE**

General

JSA ID		**Status**	
Job Name	Environment-Drilling, soil sampling, well installation	**Created Date**	
Task Description	Drilling, soil sampling, and well installation	**Completed Date**	
Template			

Client / Project

Client	
Project Number	
Project Name	
Team PM	
Team Health and Safety Manager	

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer					
HASP Reviewer					

Table B2 - Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Set up necessary traffic and public access controls	1	Struck by vehicle due to improper traffic controls	Use a buddy system for placing site control cones and/or signage. Position vehicle so that you are protected from moving traffic. Wear Class II traffic vest	
2	Utility Clearance	1	Potential to encounter underground or above ground utilities while drilling.	Complete utility clearance in accordance with the Contractor Utility Clearance H&S Standard.	
3	General drill rig operation	1	Excessive noise is generated by rig operation.	When the engine is used at high RPMs or soil samples are being collected, use hearing protection.	
		2	During drill rig operation, surfaces will become hot and cause burns if touched, and COCs in the soils more readily vaporize generating airborne contaminates.	Due to friction and lack of a drilling fluid, heat will be produced during this method. Mainly drill augers. Be careful handling split spoons. Wear proper work gloves. When soils and parts become heated, the COC could volatilize. Air monitoring should always be performed in accordance with the HASP.	
		3	Moving parts of the drilling rig can pull you in causing injury. Pinch points on the rig and auger connections can cause pinching or crushing of body parts.	Stay at least 5 feet away from moving parts of the drill rig. Know where the kill switch is, and have the drillers test it to verify that it is working. Do not wear loose clothing, and tie long hair back. Avoid wearing jewelry while drilling. Cone off the work area to keep general public away from the drilling rig.	
		4	Dust and debris can cause eye injury and soil cuttings and/or water could contain COCs.	Wear safety glasses and stay as far away from actual drilling operation as practicable. Wear appropriate gloves to protect from COCs.	
		5	Drilling equipment laying on the ground (i.e. augers, split spoons, decon equipment, coolers, etc.), create a tripping hazard. Water from decon buckets generate mud and cause a slipping hazard.	Keep equipment and trash picked up, and store away from the primary work area.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		6	The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Clearance H&S Standard for guidance.	
4	Mudd rotary drilling	1	The raised derrick can strike overhead utilities, tree limbs or other elevated items.	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
		2	This technology uses fluid, which collects with sediments in large basin. Fluid can splash out and cause slipping/mud hazard. Liquid mixture can splash into your eyes.	Wear rubber boots if needed, and keep clear of muddy/wet area as much as practicable. If area becomes excessively muddy, consider mud spikes or covering the area with a material that improves traction. Wear safety glasses.	
5	Hollow stem auger drilling	1	All hazards in step 3 apply. Additionally, the raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
		2	Hands or fingers can get caught and crushed if trying to clean by hand or with tools while the auger is still turning.	Auger should always be stopped and clutch disengaged prior to cleaning.	
6	Air Rotary Drilling	1	This drilling method works with high air pressure and can generate flying debris that can strike your body or get in your eyes.	When the drill rig is being driven into media, it will produce flying debris. The flaps behind the drill rig should stay closed whenever possible to reduce the risk of flying debris. Safety glasses and hard hat should always be worn when the drill rig is operating. When penetrating asphalt, protect surrounding cars that may be present to avoid damage to pain or windshields.	
		2	The raise derrick can strike overhead utilities, tree limbs or other elevated items.	Never move this rig with the derrick up. Ensure there is proper clearance to raise the derrick and that you are far enough away from overhead power lines. See the Utility clearance H&S Standard for guidance.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		3	When drilling through bedrock prior to groundwater, dust can be produced from pulverization. Inhalation of dusts/powder can occur.	Supplemental water should be used to manage dust and/or dust masks should be used if necessary.	
7	Reverse rotary drilling	1	This method will use fresh water to pump out drill cuttings through the center of the casing. Water/sediment mixture is generated and could cause contact with impacted soils or groundwater.	Ensure the pit construction can hold the amount of cuttings that are anticipated. Air monitoring should also be used of pit area.	
		2	Fire hydrants are often used for water source. Hydrants deliver water at high pressure. Pressurized water can cause flying parts/debris and excessive slipping hazards.	Water usage from fire hydrants should be cleared with local municipalities prior to use. Only persons that know how to use the hydrant should be performing this task. Ensure all connections are tight, and hose line is not run over to cut by traffic. Any leaks from the hydrant should be reported immediately.	
		3	Settling pit construction can cause tripping hazard from excavated soils, and plastic sheeting can cause slipping.	Cone off the area to keep the general public/visitors away from the settling pit. Ensure proper sloping of excavation.	
		4	The raised derrick can strike overhead utilities, tree limbs or other elevated items.	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
8	Rotosonic drilling	1	Fire hydrants are often used for water source. Hydrants deliver water at high pressure. Pressurized water can cause flying parts/debris and excessive slipping hazards.	Water usage from fire hydrants should be cleared with local municipalities prior to use. Only persons that know how to use the hydrant should be performing this task. Ensure all connections are tight, and hose line is not run over to cut by traffic. Any leaks from the hydrant should be reported immediately.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		2	This method requires a lot of clearance. The drill head can turn 90 degrees to attach to the next drill flight or casing. This usually requires a large support truck to park directly behind the rig. As the drill head raises the new casing flight is angled down at the same time until it can be turned completely vertical.	Ensure sufficient overhead clearance.	
		3	Heavy lifting of cores can cause muscle strain.	Always use 2 people to move core containers. Use caution moving core samples to layout area. Plan layout area to ensure adequate aisle space between core runs for logging. Keep back straight and use job rotation.	
		4	The rotosonic drill head can move very quickly up and down while working on a borehole. Moving parts can strike someone or catch body parts.	The operator and helper must communicate and stay clear of the path of the drill head. The drill utilizes two large hydraulic clamps to continuously hold casings while load/unloading previous casings. Do not wear loose clothing.	
9	Direct push drilling	1	The drill rods will be handled by workers most of the time rather than the rig doing it, therefore pinch points can cause lacerations and crushing of fingers/body parts.	Keep a minimum of 5 feet away from drill rig operation and moving parts.	
		2	The direct push rigs are usually meant to fit in spaces where larger rig can't. Tight spaces can pin workers.	Do not put yourself between the rig and a fixed object. Use Spotters or a tape measure to ensure clearances in tight areas. Pre-plan equipment movement from one location to the next.	
		3	Some direct push equipment is controlled by wireless devices. These controls can fail and equipment can strike workers or cause damage to property.	The drill rig should be used in a large open area to test wireless controls prior to moving to boring locations. The operator of the rig will test the kill switch with wireless remote prior to use. Operator will stay in range of rig while moving so that wireless signal will not be too weak and cause errors to the controls.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		4	Sampling sleeves must be cut to obtain access to soil. Cutting can cause lacerations.	It's preferable to let the driller cut the sleeves open. Many drillers have holders for the sleeve to allow for stability when cutting. If you cut the sleeves, use a hook blade, change blade regularly, and cut away from the body.	
		5	Soil cores may contain contaminated media.	Wear nitrile gloves and safety glasses for protection from contaminated media when logging soil borings.	
10	Rock coring	1	Flying debris can hit workers or cause debris to get in eyes.	Rock chips or overburden may become airborne from drilling method. Wear safety glasses and hard hat and remain at a safe distance from back of drill rig.	
		2	Heavy lifting of cores can cause muscle strain.	Always use 2 people to move core containers. Use caution moving core samples to layout area. Plan layout area to ensure adequate aisle space between core runs for logging. Keep back straight and use job rotation.	
11	Sample collection and processing	1	Injuries can result from pinch points on sampling equipment, and from breakage of sample containers.	Care should be taken when opening sampling equipment. Look at empty containers before picking them up, and do not over-tighten container caps. Use dividers to store containers in the cooler so they do not break.	Sample Cooler Handling JSA
		2	Lifting heavy coolers can cause back injuries.	Use two people to move heavy coolers. Use proper lifting techniques.	
12	Monitoring well installation	1	Same hazards as in Step 3 with general drill rig operation	See step 3	
		2	Monitoring well construction materials can clutter the work area causing tripping hazards.	Well construction materials should be picked up during the well installation process.	
		3	Heavy lifting can cause muscle strains, and cutting open bags can cause lacerations.	Well construction materials are usually 50 lbs or greater. Team lift or use drill rig to hoist bags. Always use work gloves while cutting open bags.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		4	Well pack material (i.e. sand, grout, bentonite) can become airborne and get in your eyes.	Wear safety glasses for protection from airborne sand and dust.	
		5	Cutting the top of the well to size can cause jagged/sharp edges on the top of the well casing.	Wear gloves when working with the top of the well casing, and file any sharp jagged edges that resulted from cutting to size.	
13	Soil cutting and purge water management	1	Moving full drums can cause back injury, or pinching/crushing injury.	Preferably have the drilling contractor move full drums with their equipment. If this is not practicable, use lift assist devices such as drum dollies, lift gates, etc. Employ proper lifting techniques and identify pinch/crush points. Wear leather work gloves, and clear all walking and work areas of debris prior to moving a drum.	Drum Handling JSA

Table B3 - PPE Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)	leather	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Required
Miscellaneous PPE	traffic vest--Class II or III		Required
Respiratory Protection	dust mask		Recommended

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)	Driller to provide and manage	Recommended
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
Personal	eye wash (specify type)	bottle	Required
	water/fluid replacement		Recommended
Traffic Control	traffic cones		Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**		

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Attachment C – Personal Protective Equipment (PPE) Lists

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Table C1 - PPE Checklist

R = Equipment required to be present on the site. **O** = Optional equipment. Subcontractors must have the same equipment listed here as a minimum.

Description (Put Specific Material or Type in Box)	Level Of Protection		
	D	C	B
Body			
Coveralls			
Chemical Protective Suit (include type in cell, e.g., Tyvek, Saranex, PVC, etc.)			
Splash Apron			
Rain Suit			
Traffic Safety Vest (reflective)			
Head			
Hard Hat (if does not create other hazard)			
Head Warmer (depends on temperature and weather conditions)			
Eyes & Face			
Safety Glasses (incorporate sun protection as necessary)			
Goggles (based on hazard)			
Splash Guard (based on hazard)			
Ears			
Ear Plugs			
Ear Muffs			
Hands and Arms			
Outer Chemical Resistant Gloves (specify the type of glove based on chemical hazard)			
Inner Chemical Resistant Gloves (specify the type of glove based on chemical hazard)			
Insulated Gloves			
Work Gloves*			
Foot			
Safety Boots (steel toe and shank)			
Rubber, Chemical Resistant Boots			
Rubber Boots			
Disposable Boot Covers			
Respiratory Protection			
1/2 Mask APR			
Full Face APR			
Dust Protection			
Powered APR			
SCBA			
Air Line			

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Attachment D – Material Safety Data Sheets (MSDSs)

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Material Safety Data Sheets should be added once the Phase II Environmental Site Assessment Scope of Work has been defined.

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Attachment E – Health and Safety Plan (HASP) Forms

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Form E1 – Tailgate Health and Safety Meeting Form

TAILGATE HEALTH & SAFETY MEETING FORM

This form documents the tailgate meeting conducted in accordance with the Project HASP. Personnel who perform work operations on-site during the day are required to attend this meeting and to acknowledge their attendance, at least daily.

Project Name:			**Project Location:**
Date:	**Time:**	**Conducted by:**	**Signature/Title:**
Client:		**Client Contact:**	**Subcontractor companies:**

TRACKing the Tailgate Meeting

Think through the Tasks (list the tasks for the day):

1 _____ 3 _____ 5 _____

2 _____ 4 _____ 6 _____

Other Hazardous Activities - Check the box if there are any other ARCADIS, Client or other party activities that may pose hazards to ARCADIS operations ☐ If there are none, write "None" here: _____

If yes, describe them here: _____

How will they be controlled? _____

Prework Authorization - check activities to be conducted that require permit issuance or completion of a checklist or similar before work begins:

	Doc #		Doc #		Doc #
☐ Not applicable		☐ Working at Height		☐ Confined Space	
☐ Energy Isolation (LOTO)		☐ Excavation/Trenching		☐ Hot Work	
☐ Mechanical Lifting Ops		☐ Overhead & Buried Utilities		☐ Other permit	

Discuss following questions (for some review previous day's post activities). **Check if yes :**

☐ Topics from Corp H&S to cover?	☐ Incidents from day before to review?	☐ Lessons learned from the day before?
☐ Any Stop Work Interventions yesterday?	☐ Any corrective actions from yesterday?	☐ Will any work deviate from plan?
☐ If deviations, notify PM & client	☐ JLAs or procedures are available?	☐ Field teams to "dirty" JLAs, as needed?
☐ All equipment checked & OK?	☐ Staff has appropriate PPE?	☐ Staff knows Emergency Plan (EAP)?
☐ Staff knows gathering points?		

Comments: _____

Recognize the hazards (check all those that are discussed) (Examples are provided) and **Assess** the Risks (Low, Medium, High - circle risk level) - Provide an overall assessment of hazards to be encountered today and briefly list them under the hazard category.

☐ Gravity (i.e., ladder, scaffold, trips) (L M H)	☐ Motion (i.e., traffic, moving water) (L M H)	☐ Mechanical (i.e., augers, motors) (L M H)
☐ Electrical (i.e., utilities, lightning) (L M H)	☐ Pressure (i.e., gas cylinders, wells) (L M H)	☐ Environment (i.e., heat, cold, ice) (L M H)
☐ Chemical (i.e., fuel, acid, paint) (L M H)	☐ Biological (i.e., ticks, poison ivy) (L M H)	☐ Radiation (i.e., alpha, sun, laser) (L M H)
☐ Sound (i.e., machinery, generators) (L M H)	☐ Personal (i.e. alone, night, not fit) (L M H)	☐ Driving (i.e. car, ATV, boat, dozer) (L M H)

Continue TRACK Process on Page 2

TAILGATE HEALTH & SAFETY MEETING FORM - Pg. 2

Control the hazards (Check all and discuss those methods to control the hazards that will be implemented for the day): Review the HASP, applicable JLAs, and other control processes. Discuss and document any additional control processes.

☒ **STOP WORK AUTHORITY** (Must be addressed in every Tailgate meeting - (*See statements below*)

☐ Elimination	☐ Substitution	☐ Isolation
☐ Engineering controls	☐ Administrative controls	☐ Monitoring
☐ General PPE Usage	☐ Hearing Conservation	☐ Respiratory Protection
☐ Personal Hygiene	☐ Exposure Guidelines	☐ Decon Procedures
☐ Emergency Action Plan (EAP)	☐ Fall Protection	☐ Work Zones/Site Control
☐ JLA to be developed/used *(specify)*	☐ LPO conducted *(specify job/JLA)*	☐ Traffic Control
☐	☐	☐ Other *(specify)*
☐	☐	☐

Signature and Certification Section - Site Staff and Visitors

Name/Company/Signature	Initial & Sign in Time	Initial & Sign out Time	I have read and understand the

Important Information and Numbers

All site staff should arrive fit for work. If not, they should report to the supervisor any restrictions or concerns.

In the event of an injury, employees will call WorkCare at 1.800.455.6155 and then notify the field supervisor who will, in turn, notify Corp H&S at 1.720.344.3844.

In the event of a motor vehicle accident, employees will notify the field supervisor who will then notify Corp H&S at 1.720.344.3844 and then Corp Legal at 1.720.344.3756.

In the event of a utility strike or other damage to property of a client or 3rd party, employees will immediately notify the field supervisor, who will then immediately notify Corp Legal at 1.678.373.9556 and Corp H&S at

Visitor Name/Co - not involved in work

In	Out
In	Out
In	Out
In	Out

I will STOP the job any time anyone is concerned or uncertain about health & safety or if anyone identifies a hazard or additional mitigation not recorded in the site, project, job or task hazard assessment.

I will be alert to any changes in personnel, conditions at the work site or hazards not covered by the original hazard assessments.

If it is necessary to **STOP THE JOB**, I will perform **TRACK**; and then amend the hazard assessments or the HASP as needed.

I will not assist a subcontractor or other party with their work unless it is absolutely necessary and then only after I have done TRACK and I have thoroughly controlled the hazard.

Post Daily Activities Review - Review at end of day or before next day's work (Check those applicable and explain:)

- ☐ Lessons learned and best practices learned today: _____
- ☐ Incidents that occurred today: _____
- ☐ Any Stop Work interventions today? _____
- ☐ Corrective/Preventive Actions needed for future work: _____
- ☐ Any other H&S issues: _____

Keep H&S 1st in all things

WorkCare - 1.800.455.6155

Form E2 – Real Time Exposure Monitoring Data Collection Form

Real Time Exposure Monitoring Data Collection Form

Document all air monitoring conducted on the Site below. Keep this form with the project file.

Site Name: _____ Date: _____

Instrument: _____ Model: _____ Serial #: _____

Calibration Method: (Material used settings, etc.)	
Calibration Results:	
Calibrated By:	

Activity Being Monitored	Compounds/Hazards Monitored	Time	Reading	Action Required? Y/N

Describe Any Actions Taken as a Result of this Air Monitoring and Why (does it match Table 5-1):

_____

_____

Form E3 – Hazardous Materials Transportation Form

Hazardous Materials Transportation Form

	Vehicle (place X in box)	Type (pick-up, car, box truck, etc.)
Personal		
Rental		
ARCADIS owned/leased		
Government owned		
Trailer		

Materials Transported	Quantity	Storage/Transport Container

List Trained Drivers:

_____

_____

Hazardous Materials Shipment Form

Material Description and Proper Shipping Name (per DOT or IATA)	Shipment Quantity	DOT Hazard Classification	Shipment Method (air/ground)

List Shipper (i.e., who we are offering the shipment to):

_____

_____

List Trained Employee(s):

_____

_____

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Attachment F – Visitor Acknowledgement and Acceptance

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Form F1 - Visitor Acknowledgement and Acceptance of HASP Signature Form

By signing below, I waive, release and discharge the owner of the site and Contractor and their employees from any future claims for bodily and personal injuries, which may result from my presence at, entering, or leaving the site and in any way arising from or related to any and all known and unknown conditions on the site.

Name	Company	Reason for Visit	Date/Time On Site	Date/Time Off Site

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Attachment G – Emergency Action Plan

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Attachment H – Employee and Subcontractor Signature Form

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Form H1- Employee Signature Form

I certify that I have read, understand, and will abide by the safety requirements outlined in this HASP.

Printed Name	Signature	Date

Form H2 - Subcontractor Acknowledgement: Receipt of HASP Signature Form

Contractor claims no responsibility for the use of this HASP by others although subcontractors working at the site may use this HASP as a guidance document. In any event, Contractor does not guarantee the health and/or safety of any person entering this site. Strict adherence to the H&S guidelines provided herein will reduce, but not eliminate, the potential for injury at this site. To this end, health and safety becomes the inherent responsibility of personnel working at the site.

Printed Name	Company	Signature	Date

Attachment I – 2016 Traffic Control Plan and Construction Management Plan

(Sample shown – to be replaced with actual TCP or CMP)

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Form I1 - Traffic Control Plan/Site Traffic Awareness and Response Plan

Traffic Control Plan/Site Traffic Awareness and Response Plan
Revision 8, 10/15/2015

1.0 General

Plan type	Select
Project Name:	
Project Number:	
Developer Name:	
Not Applicable	
Not Applicable	
Not Applicable	
Not Applicable	
Not Applicable	
Not Applicable	

Comments:

2.0 Work Description

Provide a brief description of scope of work:

3.0 Type and Duration

Work locations on this project will be: Select

Special traffic conditions may include (select most prevalent): Not applicable

4.0 Traffic Control Layout, Number of Devices Required and Phasing

The following pedestrian requirements in the Field Guide to RWZ Safety applies:

Select the traffic control devices to be used and enter number each required:

Check all that apply:	*Wording or Pictogram*	*Number:*
☐ Warning signs		
☐ Warning signs		
☐ Warning signs		
☐ Stop/Slow paddle		
☐ Red flag		
☐ Drums		
☐ Channelizer cone (42 inch height, 10 lb base)		
☐ Channelizer cone (42 inch height, 30 lb base)		
☐ Traffic cones (≥ 18 inches tall)		
☐ Barricade ☐ Type I ☐ Type II		
☐ Flags for cones		
☐ Lights (for night work)		
☐ Plastic fencing (rolls)		
☐ Caution tape (rolls)		
☐ Other (specify):		

5.0 Approvals

Plan Developer: _____

HASP Reviewer _____

SOUTH STATION
EXPANSION

Appendix C-2 Site Specific Health and Safety Plan – Widett Circle Layover Facility

June 2016

massDOT
Massachusetts Department of Transportation

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Site Specific Health and Safety Plan – Widett Circle Layover Facility

TBD

Designated Health and Safety (H&S) Plan Writer

TBD

Designated Health and Safety (H&S) Plan Reviewer

TBD

Project Manager

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Forward

The following Health and Safety Plan (HASP) has been prepared in accordance with the Occupational Safety and Health Administration's (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard, 29 CFR 1910.120. This HASP is applicable to the future Phase II Environmental Site Assessment (ESA) activities planned for the Widett Circle site. At the time of preparation of this HASP, a Phase II ESA Scope of Work (SOW) has not been prepared for the site. Therefore, there are several sections of the following HASP that will require review once the Phase II ESA SOW is finalized. The sections requiring potential revisions are identified in the text of the HASP and include, but are not limited to, emergency contact information, job safety analyses, personnel exposure monitoring, and client specific health and safety (H&S) requirements.

1. Introduction

This HASP has been prepared for the Phase II ESA work planned for Widett Circle layover facility site located in Boston, Massachusetts. The work on this project will be carried out in compliance with Contractor's H&S Standards, and the Occupational Safety and Health Administration's (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) regulation. Specific H&S information for the project is contained in this HASP. All personnel working on hazardous operations or in the area of hazardous operations shall read and be familiar with this HASP before doing any work. All project personnel shall sign the certification page acknowledging that they have read and understand this HASP.

Changes in the scope of the project or introduction of new hazards to the project shall require revision of the HASP by the HASP writer and reviewer, and approval by the PM. The HASP Addendum Form and Log Table are included as Attachment A.

2. Emergency Contact Information and Procedures

Table 1 presents the Emergency Contact Information associated with the planned Phase II ESA work. List the appropriate Contractor PM, Contractor H&S Manager, and Client H&S Contact once they have been identified. The information in Table 1 should be revised, if necessary, upon review of the Phase II ESA SOW and prior to initializing the Phase II ESA activities.

Table 1 — Emergency Contact Information

Contact	Contact Information
Local Police – Boston Police	911 and 617-343-4730
MBTA Transit Police	617-222-1212
Local Ambulance – Boston Fire Department	911 and 617-343-3415
Local Fire Department – Boston Fire Department	911 and 617-343-3415
Local Hospital: Boston Medical Center	617-414-4075
Local Weather Data	Weather.com
Poison Control	800-332-3073
National Response Center (all spills in reportable quantities)	800-424-8802
U.S. Coast Guard (spills to water)	800-424-8802
Team PM	TBD
Team H&S Manager	TBD
Client H&S Contact	TBD

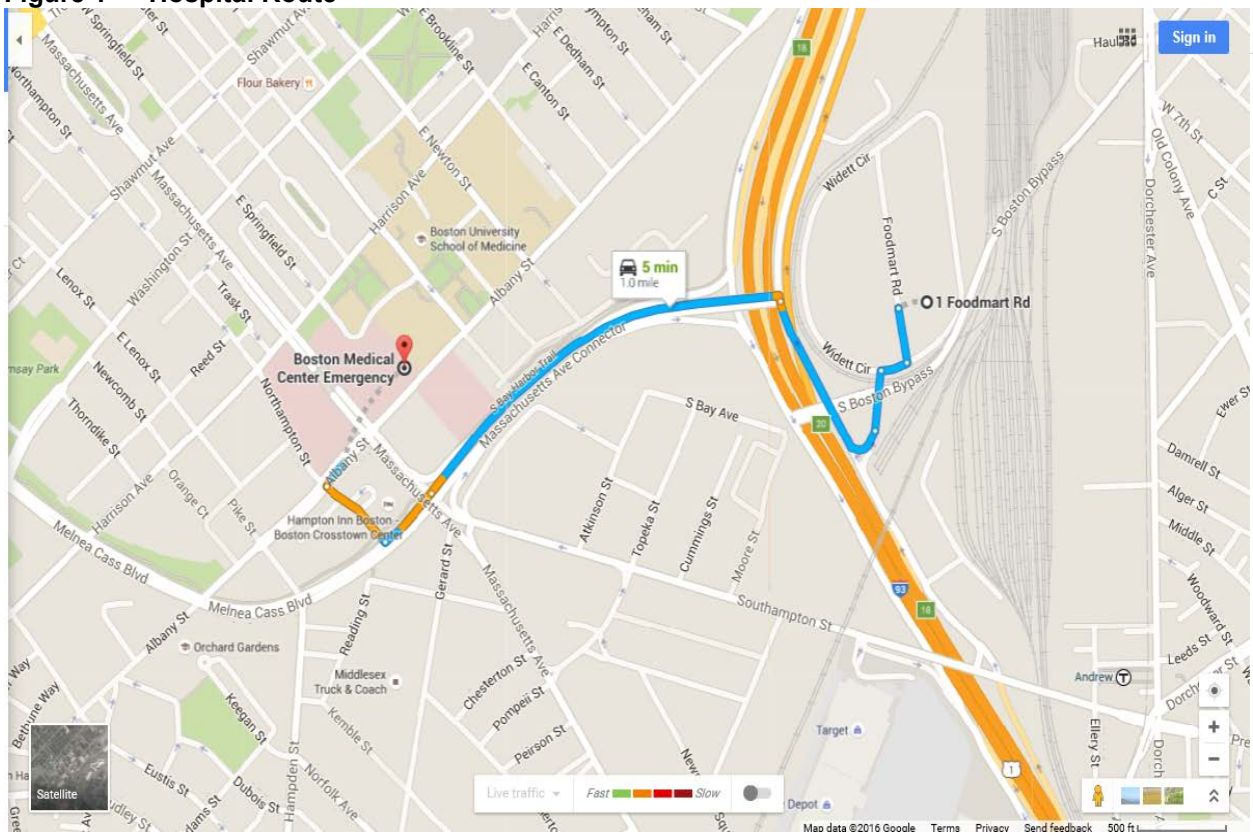
Table 2 presents the location of and directions to the nearest hospital with emergency medicine capabilities should transportation be required during the completion of the Phase II ESA work (see Figure 1). The information in Table 2 should be revised, if necessary, upon review of the Phase II SOW and prior to initializing the Phase II ESA activities.

Table 2 —Hospital Location and Directions

Medical Facility	Boston Medical Center
Address	751 Albany Street, Boston, MA 02111
Phone Number	617-636-5000

1. Take Foodmart Road and Access Rd to I-93 Frontage Road.
2. Head south on Foodmart Road toward Widett Circle.
3. Turn right onto Widett Circle.
4. Turn left onto Access Road.
5. Take Massachusetts Ave Connector to Northampton Street.
6. Sharp right onto I-93 Frontage Road.
7. Use the left 2 lanes to turn left onto Massachusetts Avenue Connector.
8. Continue onto Melnea Cass Boulevard.
9. Turn right onto Northampton Street.
10. Turn right onto Albany Street.
11. Destination will be on the right, Boston Medical Center, 759 Albany Street, Boston, MA 02118.

Figure 1 — Hospital Route



2.1 Emergency Notification Procedure for the Project

1. Dial 911 (if necessary).
2. Contact Project Manager (PM)/Task Manager (TM).
3. Contact Team H&S Coordinator.
4. Contact Client H&S and Safety Contact.

2.2 Emergency Supplies and Equipment List

Table 3 presents the appropriate Emergency Supplies and Equipment List for the planned Phase II ESA work. Select the appropriate supplies and equipment based on the proposed work. The information in Table 3 should be revised, if necessary, upon review of the Phase II SOW and prior to initializing the Phase II ESA activities.

Table 3 — Emergency Supplies and Equipment List

Emergency Supplies and Equipment (check all that apply)	Location on Project Site
☒ First Aid Kit (type):	TBD
☒ Fire Extinguisher	TBD
☒ Mobile Phone ☐ Satellite Phone	TBD
☒ Traffic Cones	TBD
☐ Walkie Talkies	
☐ Water or Other Fluid Replenishment	
☐ Eye Wash/Quick Drench Station	
☒ Eye Wash Bottle	TBD
☐ Wash and Dry Towelettes	
☐ Sunscreen (SPF 15 or higher)	
☐ Insect Repellant	
☒ Chemical Spill Kit	TBD
☐ *Other (specify):*	

3. Project and Site History Requirements

3.1 Site Background

The Widett Circle layover facility site is located in South Boston along the MBTA's Fairmount Line, approximately one track-mile from South Station. Cold storage facilities and food processing/storage industries have been at the site since initial development in the mid-1980s.

3.2 Site Description

The site is comprised of multiple parcels, primarily in private ownership: Cold Storage and Widett Circle. Cold Storage located at 100 Widett Circle, currently houses a temperature controlled food storage and distribution facility. The building has an active rail siding served by CSX Transportation, Inc. (CSXT). Widett Circle, located at 1 and 2 Foodmart Road, is made up of approximately 30 units leased to multiple businesses in the food processing, food storage, and food logistics industry.

1. LOT 1 Foodmart Road: One cold storage warehouse, one storage warehouse, multiple industrial offices and a restaurant. There is a freight elevator and a concrete loading dock in use at the property as well as a paved parking lot. The total gross area is 177,260 sf.
2. LOT 2 Foodmart Road: One cold storage warehouse, storage warehouse and multiple industrial offices. There is also a loading dock and paved parking area. The total gross area is 98,192 sf.

3. 100 Widett Circle and Foodmart Road: One building comprised of four cold storage warehouses owned by Americold with a cumulative area of 180,074 sf. Industrial offices, a freight elevator and a concrete loading dock are also part of the site. The total gross area is 192,008 sf.
4. Widett Circle and Foodmart Road: There are no property improvements for this section of land according to the Property Assessment card for 2015. This western portion of the parcel includes a portion of Amtrak's wet/dry tracks which are not a part of this investigation.
5. R W Fourth Street: There are no property improvements to this section according to the Property Assessment database for 2015.

Table 4 lists various site types which can have an effect on HASP requirements for the planned Phase II ESA work. Select the appropriate characteristics for the site.

Table 4 — Site Type (Check as many as applicable)

X	Active	X	Secure	X	Industrial		Landfill		Service station
	Inactive	X	Unsecured	X	Commercial		Well field		Water work
			Uncontrolled		Residential	X	Railroad		Undeveloped
Other specify:									

Based on the completion of a Phase I ESA, several potential Chemicals of Concern (COCs) were identified. These primary COCs include, but may not be limited to, those listed in Table 5.

Table 5 — Primary Chemicals of Concern

Known Compounds	Source (soil/water/drum, etc.)	Known Concentration Range (ppm, mg/kg, mg/l)	
		Lowest	Highest
Polychlorinated biphenyls (PCBs)	Soil	unknown	unknown
Volatile Petroleum Hydrocarbons	Soil/Water	unknown	unknown
Extractable Petroleum Hydrocarbons	Soil/Water	unknown	unknown
Volatile Organic Compounds	Soil/Water	unknown	unknown
Polyaromatic Hydrocarbons	Soil/Water	unknown	unknown
Metals	Soil	unknown	unknown

3.3 List of Project Tasks and Phase II Scope of Work

1. Task 1 – Subsurface Investigation: Prior to completion of the subsurface investigation activities, a ground penetrating radar survey will be completed.
2. Task 2 – Soil Sampling: A soil sampling program will be conducted to determine the extent of potential impacts at the site. Samples will be obtained via Geoprobe® sampling techniques. Specific safety issues related to Geoprobe or other drilling techniques will be addressed in the Job Safety Analysis (JSA), a sample of which can be found in Attachment B.
3. Task 3 – Groundwater Sampling: An evaluation of the groundwater conditions at the site will include the surveying, gauging and sampling of monitor wells.

4. Contractor Organization and Responsibilities

4.1 All Personnel

Each person is responsible for completing tasks safely, and reporting any unsafe acts or conditions to their supervisor. No person may work in a manner which conflicts with these procedures. Prior to initiating site activities, all Contractor and subcontractor personnel will receive training in accordance with applicable regulations, and be familiar with the requirements and standards referenced in this HASP. In addition, all personnel will attend daily safety meetings (tailgate meetings) to discuss site-specific hazards prior to beginning each day's work. Every Contractor employee, subcontractor, and client representative at the Site has the responsibility and authority to **Stop Work** of a coworker or subcontractor if the working conditions or behaviors are considered unsafe by them. When a **Stop Work** occurs, a review of the concerns should be conducted by the crew involved. Should the crew involved not be able to address the **Stop Work** concerns, the Site Safety Officer should be notified to review the conditions. There is no required period of down time for a **Stop Work** and work can commence once the conditions have been reviewed and addressed if necessary.

4.2 Project Manager/Task Manager

The PM is responsible for verifying that project activities are completed in accordance with the requirements of this HASP. The TM is the person generally responsible for the implementation of the field activities and safety on the project site. The PM is responsible for verifying that project activities are completed in accordance with the requirements of this HASP. The PM is responsible for confirming that the project has the equipment, materials, and qualified personnel to fully implement the safety requirements of this HASP, and/or that subcontractors assigned to this project, meet the requirements established by the Contractor. It is also the responsibility of the PM to:

- Review all applicable H&S Standards, and ensure that project activities conform to all requirements;
- Obtain client-specific H&S information and communicate with the client on H&S issues;
- Communicate with the Site Safety Officer (SSO) on H&S issues;
- Allocate resources for correction of identified unsafe work conditions;
- Ensure the Contractor's site workers have all training necessary for the project; and
- Report all injuries, illnesses and near-misses to the client representative, lead incident investigations, and ensure that any recommendations made are implemented.

4.3 Site Safety Officer

The SSO has overall responsibility for the technical H&S aspects of the project. Inquiries regarding the Contractor's H&S standards, project procedures, and other technical or regulatory issues should be addressed to this individual. It is also the responsibility of the SSO to:

- Review and work in accordance with the components of this HASP;
- Ensure that this HASP is available to and reviewed by all site personnel including subcontractors;
- Ensure that necessary site-specific training is performed (both initial and "tailgate" safety briefings);
- Ensure site visitors have been informed of the hazards related to the Contractors work;
- Ensure that work is performed in a safe manner and has authority to stop work when necessary to protect workers and/or the public;

- Coordinate activities during emergency situations;
- Ensure that all necessary permits and safety information provided by the client is disseminated to other site personnel and is maintained in an organized manner;
- Communicate with the PM on H&S issues;
- Report all injuries, illnesses and near-misses to the PM;
- Ensure that necessary safety equipment is maintained and used at the site; and
- Contact a H&S professional for assistance in establishing the respiratory cartridge change schedule as required.

An individual can act as more than one role, PM, TM, and/or SSO, during field activities.

5. Project Hazards and Control Measures

5.1 Hazard Analysis

The hazards in Table 6 below must be ranked using HIGH (H), MEDIUM (M) or LOW (L) based on Figure 2 and current site knowledge. For hazards that are not applicable, leave blank. Use the results of this analysis to verify that controls in the Job Safety Analysis (JSA) or other supporting documents are adequate to mitigate task hazards. When in the field, use the Tailgate Safety Meeting Form for task specific evaluation of task hazards.

Table 6 provides various potential hazardous associated with the site, seasonal conditions, and proposed activities for the planned Phase II ESA work. Select the appropriate hazards and the appropriate severity based on the probability and severity the risks based on the proposed work. The information in Table 6 should be revised, if necessary, upon review of the Phase II SOW and prior to initializing the Phase II ESA activities.

Table 6 should be reviewed and approved by the SSO at least every six months or any time site conditions or activities change from the original scope of work associated with this HASP.

Figure 2 — Hazard Ranking Chart

Severity	Consequence		Probability				
	Property Damage	Injury	Frequent	Likely	Occasional	Seldom	Unlikely
	> $100,000	Fatality	H	H	H	H	M
	> $10,000	Injury Requiring Hospitalization	H	H	H	M	L
	> $1000	Injury Requiring Medical Treatment Beyond First Aid	H	M	M	L	L
	< $1000	Injury Requiring First Aid	M	L	L	L	L

Table 6 - Hazard Rankings

Biological		Mechanical		Chemical/Radiation	
L	Biting/stinging insects	L	Cuts on equipment/tools		
L	Biting animals	M	Pinch points on equipment	L	General
L	Poisonous plants		Burns from equipment	H	Dusts, toxic
L	Phys. damaging plants	L	Struck by equipment	L	Dusts, nuisance
				L	Chemicals, Contractor use
Driving		Motion		L	Chemicals, corrosive
L	Night driving	L	Lifting/awkward body positions		Chemicals, explosive
M	Off-road driving	H	Struck by vehicle/traffic		Chemicals, flammable
L	Urban driving				Chemicals, oxidizing
	All-terrain vehicle	Personal Safety		M	Chemicals, toxic
	Boat		Working late/night		Chemicals, reactive
			Working alone		Radiation, ionizing
Electrical			High crime area		Radiation, non-ionizing
	Wet environments				
L	Electrical panels	Pressure		Compound Specific	
L	Electric utilities	M	Utilities (gas, water, etc.)	M	Asbestos
	Electric power tools		Compressed gas cylinders	L	Benzene
			Compressed air/aerosols		Cadmium
Environment		M	Hydraulic systems		Hydrogen sulfide
L	Heat			M	Lead
L	Cold	Sound			Silica
	Lightning	L	Equipment noise		
	Inclement weather		Tool noise	Gravity	
	High wind	L	Traffic noise (vehicle/train/etc.)	M	Slip, trip, fall
					Fall from height
					Ladders or scaffolds
					Struck by falling object

5.2 Job Safety Analyses, Health and Safety Standards, and Personal Protective Equipment

Site specific Job Safety Analyses (JSAs) will be completed for each safety critical task. An example is included in Attachment B. Hazards identified in the table above will be addressed specifically in the JSAs as well as control methods to protect employees and property from hazards. The JSA must lists the type of personal protective equipment (PPE) required for the completion of the project.

- Level D protection is the minimum protection required. Appropriate Level D protective equipment may include: Gloves, coveralls, safety glasses, face shield, and chemical-resistant, steel-toe shoes.
- Level C protection is required when the concentration and type of airborne substances is known and the criteria for using air purifying respirators are met. Typical Level C equipment may include: full-face air purifying respirators, inner and outer chemical-resistant gloves, hard hat, escape mask, and disposable chemical-resistant outer boots.
- Level B protection is required under circumstances requiring the highest level of respiratory protection, with lesser level of skin protection. Examples of Level B protection include: positive pressure, full face-piece self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA; inner and outer chemical-resistant gloves; face shield; hooded chemical resistant clothing; coveralls; and outer chemical-resistant boots.
- Level A protection is required when the greatest potential for exposure to hazards exists, and when the greatest level of skin, respiratory, and eye protection is required. Examples of Level A clothing

and equipment include: positive pressure, full face-piece SCBA or positive pressure supplied air respirator with escape SCBA; totally encapsulated chemical- and vapor-protective suit; inner and outer chemical-resistant gloves; and disposable protective suit, gloves, and boots.

A detailed list of PPE for the project is located in Attachment C.

Items for which the Contractor should have H&S Standards for this project are listed below. These standards should be reviewed by the PM, TM and site personnel. Prior to initializing the Phase II ESA SOW the potential for client specific JSAs, H&S standards, and PPE requirements need to be reviewed. The Client's H&S Contact should be contacted with any questions concerning the client specific standards, including:

- Utility Location;
- Drilling, Excavation and Trenching;
- Benzene;
- Asbestos;
- Polychlorinated biphenyls (PCBs); and/or
- Lead.

6. Hazard Communication

All project-required chemicals must be handled in accordance with the Contractor's Standard. The table below lists all chemicals that will be brought, used, and/or stored on the site by Contractor's and/or its subcontractors. Material Safety Data Sheets (MSDS) for chemicals brought on site are included in Attachment D. In Table 7 below, list the chemicals anticipated to be used by the Contractor on this project subject to Hazard Communication (HazCom) requirements. Modify quantities as needed.

Table 7 provides a list of various chemicals that may be used on site during the activities for the planned Phase II ESA work. Select the appropriate on-site chemicals based on the proposed work and the expected quantities to be onsite. The information in Table 7 should be revised, if necessary, upon review of the Phase II SOW and prior to initializing the Phase II ESA activities. This list should be updated when any new chemicals are brought to the site and reviewed every six months during the project to ensure its accuracy.

Table 7 — On-Site Chemicals

	Acids/Bases	Qty.		Decontamination	Qty.		Calibration	Qty.
☐	Not applicable		☐	Not applicable		☐	Not applicable	
☐	Hydrochloric acid		☐	Alconox		☐	Isobutylene/air	
☐	Nitric acid		☐	Liquinox		☐	Methane/air	
☐	Sulfuric acid		☐	Acetone		☐	Pentane/air	
☐	Sodium hydroxide		☐	Methanol		☐	Hydrogen/air	
☐	Zinc acetate		☐	Hexane		☐	Propane/air	
☐	Ascorbic acid		☐	Isopropyl alcohol		☐	Hydrogen sulfide/air	
☐	Acetic acid		☐	Nitric acid		☐	Carbon monoxide/air	
☐	Other:		☐	Other:		☐	pH standards (4,7,10)	
						☐	Conductivity standards	
						☐	Other:	

	Fuels	Qty.		Kits	Qty.			
☐	Not applicable		☐	Not applicable				
☐	Gasoline		☐	Hach			Specify:	
☐	Diesel		☐	DTECH			Specify:	
☐	Kerosene		☐	EPA 5035 Soil			Specify:	
☐	Propane		☐	Other:				
☐	Other:							
	Remediation	**Qty.**					**Other:**	**Qty.**
☐	Not applicable					☐	Not applicable	
☐	Other:					☐	Spray paint	
☐	Other:					☐	WD-40	
☐	Other:					☐	Pipe cement	
☐	Other:					☐	Pipe primer	
☐	Other:					☐	Mineral spirits	

7. Chemical Hazards

As required, air monitoring will be conducted and as outlined in this HASP to collect exposure data for COCs or for chemicals brought onsite for use. Table 8 lists the properties of chemicals that will be encountered at the site.

Table 8 — Chemical Hazard Information

Chemical Name	IP (eV)	Routes of Entry/ Exposure Symptoms	8-hr TWA[a] (ppm)	IDLH[b] (NIOSH) (ppm)	STEL (ppm)	Source TLV/PEL
Lead		inhalation	.05 mg/m^3	100 mg /m^3 (as Pb)	Not Listed	.05 mg/m^3

NA - not applicable

[a] The Threshold Limit Value (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH) is listed unless the Permissible Exposure Limit (PEL), designated by OSHA, is lower.

[b] Immediately Dangerous To Life or Health (IDLH) per the National Institute for Occupational Safety and Health (NIOSH).

See Section 9 for information on air monitoring requirements.

8. Tailgate Meetings

Tailgate safety briefings must be conducted at least once daily and should be conducted twice daily (at the start of the job and after midday meal break), or as tasks/hazards change. Each tailgate safety briefing must be documented on the form included in Attachment E and maintained with the project files. The tailgate safety briefing will serve as a final review for JSAs, hazard identification and controls to be utilized.

9. Personal Exposure Monitoring and Respiratory Protection

This section has been provided should personal exposure monitoring and respiratory protection be required. Based on the final Phase II SOW, the Team H&S Manager will determine the necessity of this section. This determination is to be conducted prior to implementing the Phase II ESA SOW.

Personal and area exposure monitoring will be documented on the Real Time Exposure Monitoring Data Form provided in Attachment E. All monitoring equipment will be maintained and calibrated in accordance with manufacturer's recommendations. All pertinent monitoring data will be logged on the form and

maintained on site for the duration of project activities. Calibration of all monitoring equipment will be conducted daily and logged on the same form.

Table 9 lists exposure monitoring requirements and associated action levels for site exposure hazards (e.g. chemical, noise, radiation, etc.). Action levels have been developed for exposure monitoring with real-time air monitoring instruments as specified in the table. Air monitoring data will determine the required respiratory protection levels at the Site during scheduled intrusive activities. The action levels are based on sustained readings indicated by the instrument(s). Air monitoring will be performed and recorded at up to 30-minute intervals.

If elevated concentrations are indicated, the monitoring frequency will be increased, as appropriate. If sustained measurements are observed during this time, the following actions will be instituted, and the PM and Project H&S Manager will be notified. For purposes of this HASP, sustained readings are defined as the average airborne concentration maintained for a period of one (1) minute.

Table 9 — Exposure Monitoring Requirements

TASK 1 – Is exposure monitoring required for the completion of this task? ☐ YES ☐ NO
If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level	Required Action
TBD				

TASK 2 – Is exposure monitoring required for the completion of this task? ☐ YES ☐ NO
If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level	Required Action
TBD				

TASK 3 – Is exposure monitoring required for the completion of this task? ☐ YES ☐ NO
If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level	Required Action
TBD				

9.1 Respirator Cartridge Change Schedule

Respirators will be stored in clean containers (i.e., self-sealing bag) when not in use. If respirators are required to be worn based on the action levels established above, respirator cartridges will be replaced in accordance with the following change-out schedule provided in Table 10.

Table 10 — Respirator Cartridge Change Schedule

Type of Cartridge	Cartridge Change-out Schedule
Particulate (i.e., High Efficiency Particulate Air)	At least weekly or whenever the employee detects an increase in breathing resistance. This will occur as the filter becomes loaded with particulate matter.
Sorbent (i.e., organic vapor)	At the end of each day's use or sooner, if the respirator manufacturer change-out schedule software program dictates otherwise. The Project H&S Manager or the PM must be consulted regarding gas/vapor cartridge change-out schedule. This will be determined per the Contractors Respiratory Protection standard.

Personnel who wear air purifying respirators (APRs) must be trained in their use, must have successfully passed a qualitative respiratory fit test within the last 12 months, and must have medical clearance for APR use.

With the exception of protection against particulates[1], if the action plan outlined above calls for an upgrade to an air-purifying respirator (for protection against organic vapors and other gaseous chemicals), the following will apply:

- The respirator cartridge will be equipped with an end-of-service-life indicator (ESLI) certified by National Institute for Occupational Safety and Health (NIOSH) for the contaminant; or
- If there is no ESLI appropriate for a contaminant, the project will implement a change schedule for cartridges to ensure that they are changed before the end of their service life.

10. Medical Surveillance

Medical surveillance requirements are outlined in the Contractor Medical Monitoring Standard. All medical surveillance requirements as indicated must be completed and site personnel medically cleared before being permitted on the project site.

11. General Site Access and Control

The SSO will coordinate access and control security at the work site. As the work dictates, the SSO will establish a work area perimeter. The size of the perimeter will be based on the daily task activities and will be discussed with all project personnel during the tailgate meeting and then documented on the tailgate meeting form. Control zones for Level C or above, as described previously, will be demarcated by either visual or physical devices and will be monitored for effectiveness by the SSO.

Only authorized personnel will be allowed beyond the perimeter. Other site workers and visitors to the site should be kept out of the work site. If visitors need access to the site, the SSO will escort the visitor at all times. All visitors will log in and out with the SSO. The visitor log sheet is included in Attachment F.

[1] Cartridge Change Schedule is not necessary for cartridges used in the protection against particulates provided that the cartridges are changed out when there is a perceived resistance in breathing experienced by the user.

11.1 Sanitation at Temporary Workplaces

11.1.1 Potable Water

An adequate supply of potable water must be provided on the site. Portable containers used to dispense drinking water shall be capable of being tightly closed, and equipped with a tap. Water shall not be dipped from containers. Any container used to distribute drinking water shall be clearly marked as to the nature of its contents and not used for any other purpose. Where single service cups (to be used but once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.

Potable water is available at facilities on site.

11.1.2 Toilet Facilities

Under temporary field conditions, the SSO will make provisions so that no less than one toilet facility is available. Use of a nearby toilet facility is an acceptable arrangement for mobile crews having transportation readily available.

Restroom facilities are available on site.

12. Decontamination Control Zones and Procedures

This section has been provided should decontamination control zones and procedures for Level C or higher be required. Based on the final Phase II SOW, the Team H&S Manager will determine the necessity of this section and make appropriate revisions. This determination is to be conducted prior to implementing the Phase II ESA SOW.

The zones for Level C and above will be designated by traffic cones, barricades, signs, caution tape, or other means effective in identifying the different areas. The SSO will establish control boundaries for the exclusion zone, contamination reduction zone, and the support zone. The zones will be identified by the SSO during tailgate meetings and documented on the meeting form. Entrance and exit to the exclusion zone will only be through controlled access points established for each work area.

Table 11 presents the Level A and B decontamination procedures.

Table 11 — Level A/B Decontamination Steps

Level A Decontamination Steps		Level B Decontamination Steps	
EZ-1	Segregated Equipment Drop	EZ-1	Segregated Equipment Drop
EZ-2	Boot Cover and Glove Wash	EZ-2	Boot Cover and Glove Wash
EZ-3	Boot Cover and Glove Rinse	EZ-3	Boot Cover and Glove Rinse
EZ-4	Tape Removal	EZ-4	Tape Removal
EZ-5	Boot Cover Removal	EZ-5	Boot Cover Removal
EZ-6	Outer Glove Removal	EZ-6	Outer Glove Removal
CRZ-7	Suit/Safety Boot Wash	CRZ-7	Outer Glove Removal
CRZ-8	Suit/Safety Boot Rinse	CRZ-8	Suit/SCBA/Boot/Glove Rinse
CRZ-9	Encapsulated Suit Partial Removal/Tank Change	CRZ-9	Tank Change
CRZ-9a	Redress-return to EZ	CRZ-9a	Redress-return to EZ
CRZ-10	Safety Boot Removal	CRZ-10	Safety Boot Removal
CRZ-11	Encapsulated Suit Removal	CRZ-11	SCBA Removal
CRZ-12	SCBA Removal	CRZ-12	Splash Suit Removal
CRZ-13	Inner Glove Wash	CRZ-13	Inner Glove Wash
CRZ-14	Inner Glove Rinse	CRZ-14	Inner Glove Rinse
CRZ-15	Face-piece Removal	CRZ-15	Face-piece Removal
CRZ-16	Inner Glove Removal	CRZ-16	Inner Glove Removal
CRZ-17	Inner Clothing Removal	CRZ-17	Inner Clothing Removal
SZ-18	Field Wash	SZ-18	Field Wash
SZ-19	Redress	SZ-19	Redress

Zones include:

- EZ-Exclusion Zone – The area of investigation or contamination. No personnel allowed unless appropriate PPE is worn;
- CRZ-Contamination Reduction Zone – The transition area of between contaminated areas and the support zone. Decontamination activities are conducted here; and
- SZ-Support Zone – Non-contaminated areas outside the work zone.

13. Emergency Action Plan (EAP)

An Emergency Action Plan (EAP) will be prepared and approved by the SSO. The EAP will be included in Attachment G. The EAP details the procedures to take in the event that an injury, over-exposure or spill has occurred. The EAP must be approved by the SSO and reviewed by site personnel working under this HASP. All employees working on this project must be shown the location and proper use of all emergency equipment prior to beginning work on the project.

14. Client-Specific Health and Safety Requirements

Prior to implementing the Phase II ESA, the Team H&S Manager should verify that the client does not have specific H&S requirements that apply to the proposed work. If the client has requirements they should be listed and defined in this section, otherwise thus section can be removed.

Contractor project personnel must comply with the client's specific H&S requirements at all times. Client-specific H&S requirements are as follows:

- (list requirements here)

15. Ground or Air Shipments of Hazardous Materials

All samples, electronic equipment with batteries, powders, gases, liquids, magnetized materials or radioactive materials being shipped by air or ground transport will be evaluated using the appropriate Shipping Determination process to determine if the material or equipment being shipped is hazardous for transport. All materials identified as hazardous materials (HazMat) will be shipped according to applicable MassDOT and International Air Transport Association (IATA) regulations and requirements as prescribed by the Contractor DOT Program.

All employees collecting samples, preparing HazMat packages, or offering HazMat to a 3rd-party carrier such as FedEx will have current HazMat training.

16. H&S Orientation and Task Improvement Process

As part of any project, no matter how simple or complex, Task Improvement Processes (TIPs) should be conducted when practical and when able to integrate into normal business activities. TIPs should be scheduled based on the risk of the tasks being performed, and should be conducted for different tasks and at different times. Completion of TIPs should be documented on the tailgate meeting form. The following table should be filled out upon completion of TIPs conducted on this project.

Table 12 — TIP Plan

Identified Task for TIP	Schedule Date	Observer Name	Observee Name	Feedback Supervisor Name

17. Subcontractors

A copy of this HASP is to be provided to all subcontractors prior to the start of work so that the subcontractor is informed of the hazards at the site. While the Contractor HASP will be the minimum H&S requirements for the work completed by Contractor and its subcontractors, each subcontractor, in coordination with Contractor H&S personnel, is expected to perform its operations in accordance with its own HASP, policies and procedures unique to the subcontractor's work to ensure that hazards associated with the performance of the work activities are properly controlled. Copies of any required safety documentation for a subcontractor's work activities will be provided to Contractor for review prior to the start of on-site activities.

In the event that the subcontractor's procedures/requirements conflict with requirements specified in this HASP, the more stringent guidance will be adopted after discussion and agreement between the subcontractor and Contractor project H&S personnel. Hazards not listed in this HASP, but known to the subcontractor or known to be associated with the subcontractor's services, must be identified and addressed to the Contractor project or TM and SSO prior to beginning work operations.

Should Subcontractors working at the site choose to utilize this HASP they will need to have this plan with them, and will also need to sign the Subcontractor HASP receipt signature page of the Contractor HASP

(Attachment H). Subcontractors are responsible for the health and safety of their employees at all times, and have the authority to **Stop Work** if unsafe conditions arise.

The PM/TM and SSO (or authorized representative) has the authority to halt the subcontractor's operations and to remove the subcontractor or subcontractor's employee(s) from the site for failure to comply with established H&S procedures or for operating in an unsafe manner.

18. Project Personnel HASP Certification

All site project personnel will sign the certification signature page provided in Attachment H of this HASP.

19. Roadway Work Zone Safety

All project work performed in a public or private roadway, regardless of work duration, will require a either a written Traffic Control Plan (TCP) or a Construction Management Plan (CMP). Projects having work activities on both public and private roadways will operate under a TCP approved by an employee designated with Engineering Judgment. A site specific TCP and/or CMP have been prepared for the site and work conducted as part of the Phase II Scope of Work will conform to them.

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Attachment A – Health and Safety Plan (HASP) Addendum and Log Table

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Addendum Page

This form should be completed for new tasks associated with the project. The PM and/or TM should revise the Project Hazard Analysis Worksheet with the new task information and attach to this addendum sheet. JSAs should be developed for any new tasks and attached as well.

Review the addendum with all site staff, including subcontractors, during the daily tailgate briefing, and complete the tailgate briefing form as required. Attach a copy of the addendum to all copies of the HASP including the site copy, and log in the Addendum Log Table A-1 on the next page.

Addendum Number: _____ Project Number: _____

Date of Changed Conditions: _____ Date of Addendum: _____

Description of Change that Results in Modifications to HASP:

Signed: _____ Signed: _____
Project Manager Site Safety Officer

Signed: _____ Signed: _____
H&S Plan Writer H&S Plan Reviewer

Addendum Log Table

Addendums are to be added to every copy of the HASP, and logged on Table A-1 to verify that all copies of the HASP are current:

Table A1- Addendum Log Table

Addendum Number	Date of Addendum	Reason for Addendum	Person Completing Addendum
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Attachment B – Job Safety Analysis (JSAs)

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Table B1 - Job Safety Analysis - EXAMPLE

General

JSA ID		**Status**	
Job Name	Environment-Drilling, soil sampling, well installation	**Created Date**	
Task Description	Drilling, soil sampling, and well installation	**Completed Date**	
Template			

Client / Project

Client	
Project Number	
Project Name	
Team PM	
Team Health and Safety Manager	

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer					
HASP Reviewer					

Table B2 - Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Set up necessary traffic and public access controls	1	Struck by vehicle due to improper traffic controls	Use a buddy system for placing site control cones and/or signage. Position vehicle so that you are protected from moving traffic. Wear Class II traffic vest	
2	Utility Clearance	1	Potential to encounter underground or above ground utilities while drilling.	Complete utility clearance in accordance with the Contractor Utility Clearance H&S Standard.	
3	General drill rig operation	1	Excessive noise is generated by rig operation.	When the engine is used at high RPMs or soil samples are being collected, use hearing protection.	
		2	During drill rig operation, surfaces will become hot and cause burns if touched, and COCs in the soils more readily vaporize generating airborne contaminates.	Due to friction and lack of a drilling fluid, heat will be produced during this method. Mainly drill augers. Be careful handling split spoons. Wear proper work gloves. When soils and parts become heated, the COC could volatilize. Air monitoring should always be performed in accordance with the HASP.	
		3	Moving parts of the drilling rig can pull you in causing injury. Pinch points on the rig and auger connections can cause pinching or crushing of body parts.	Stay at least 5 feet away from moving parts of the drill rig. Know where the kill switch is, and have the drillers test it to verify that it is working. Do not wear loose clothing, and tie long hair back. Avoid wearing jewelry while drilling. Cone off the work area to keep general public away from the drilling rig.	
		4	Dust and debris can cause eye injury and soil cuttings and/or water could contain COCs.	Wear safety glasses and stay as far away from actual drilling operation as practicable. Wear appropriate gloves to protect from COCs.	
		5	Drilling equipment laying on the ground (i.e. augers, split spoons, decon equipment, coolers, etc.), create a tripping hazard. Water from decon buckets generate mud and cause a slipping hazard.	Keep equipment and trash picked up, and store away from the primary work area.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		6	The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Clearance H&S Standard for guidance.	
4	Mudd rotary drilling	1	The raised derrick can strike overhead utilities, tree limbs or other elevated items.	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
		2	This technology uses fluid, which collects with sediments in large basin. Fluid can splash out and cause slipping/mud hazard. Liquid mixture can splash into your eyes.	Wear rubber boots if needed, and keep clear of muddy/wet area as much as practicable. If area becomes excessively muddy, consider mud spikes or covering the area with a material that improves traction. Wear safety glasses.	
5	Hollow stem auger drilling	1	All hazards in step 3 apply. Additionally, the raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
		2	Hands or fingers can get caught and crushed if trying to clean by hand or with tools while the auger is still turning.	Auger should always be stopped and clutch disengaged prior to cleaning.	
6	Air Rotary Drilling	1	This drilling method works with high air pressure and can generate flying debris that can strike your body or get in your eyes.	When the drill rig is being driven into media, it will produce flying debris. The flaps behind the drill rig should stay closed whenever possible to reduce the risk of flying debris. Safety glasses and hard hat should always be worn when the drill rig is operating. When penetrating asphalt, protect surrounding cars that may be present to avoid damage to pain or windshields.	
		2	The raise derrick can strike overhead utilities, tree limbs or other elevated items.	Never move this rig with the derrick up. Ensure there is proper clearance to raise the derrick and that you are far enough away from overhead power lines. See the Utility clearance H&S Standard for guidance.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		3	When drilling through bedrock prior to groundwater, dust can be produced from pulverization. Inhalation of dusts/powder can occur.	Supplemental water should be used to manage dust and/or dust masks should be used if necessary.	
7	Reverse rotary drilling	1	This method will use fresh water to pump out drill cuttings through the center of the casing. Water/sediment mixture is generated and could cause contact with impacted soils or groundwater.	Ensure the pit construction can hold the amount of cuttings that are anticipated. Air monitoring should also be used of pit area.	
		2	Fire hydrants are often used for water source. Hydrants deliver water at high pressure. Pressurized water can cause flying parts/debris and excessive slipping hazards.	Water usage from fire hydrants should be cleared with local municipalities prior to use. Only persons that know how to use the hydrant should be performing this task. Ensure all connections are tight, and hose line is not run over to cut by traffic. Any leaks from the hydrant should be reported immediately.	
		3	Settling pit construction can cause tripping hazard from excavated soils, and plastic sheeting can cause slipping.	Cone off the area to keep the general public/visitors away from the settling pit. Ensure proper sloping of excavation.	
		4	The raised derrick can strike overhead utilities, tree limbs or other elevated items.	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
8	Rotosonic drilling	1	Fire hydrants are often used for water source. Hydrants deliver water at high pressure. Pressurized water can cause flying parts/debris and excessive slipping hazards.	Water usage from fire hydrants should be cleared with local municipalities prior to use. Only persons that know how to use the hydrant should be performing this task. Ensure all connections are tight, and hose line is not run over to cut by traffic. Any leaks from the hydrant should be reported immediately.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		2	This method requires a lot of clearance. The drill head can turn 90 degrees to attach to the next drill flight or casing. This usually requires a large support truck to park directly behind the rig. As the drill head raises the new casing flight is angled down at the same time until it can be turned completely vertical.	Ensure sufficient overhead clearance.	
		3	Heavy lifting of cores can cause muscle strain.	Always use 2 people to move core containers. Use caution moving core samples to layout area. Plan layout area to ensure adequate aisle space between core runs for logging. Keep back straight and use job rotation.	
		4	The rotosonic drill head can move very quickly up and down while working on a borehole. Moving parts can strike someone or catch body parts.	The operator and helper must communicate and stay clear of the path of the drill head. The drill utilizes two large hydraulic clamps to continuously hold casings while load/unloading previous casings. Do not wear loose clothing.	
9	Direct push drilling	1	The drill rods will be handled by workers most of the time rather than the rig doing it, therefore pinch points can cause lacerations and crushing of fingers/body parts.	Keep a minimum of 5 feet away from drill rig operation and moving parts.	
		2	The direct push rigs are usually meant to fit in spaces where larger rig can't. Tight spaces can pin workers.	Do not put yourself between the rig and a fixed object. Use Spotters or a tape measure to ensure clearances in tight areas. Pre-plan equipment movement from one location to the next.	
		3	Some direct push equipment is controlled by wireless devices. These controls can fail and equipment can strike workers or cause damage to property.	The drill rig should be used in a large open area to test wireless controls prior to moving to boring locations. The operator of the rig will test the kill switch with wireless remote prior to use. Operator will stay in range of rig while moving so that wireless signal will not be too weak and cause errors to the controls.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		4	Sampling sleeves must be cut to obtain access to soil. Cutting can cause lacerations.	It's preferable to let the driller cut the sleeves open. Many drillers have holders for the sleeve to allow for stability when cutting. If you cut the sleeves, use a hook blade, change blade regularly, and cut away from the body.	
		5	Soil cores may contain contaminated media.	Wear nitrile gloves and safety glasses for protection from contaminated media when logging soil borings.	
10	Rock coring	1	Flying debris can hit workers or cause debris to get in eyes.	Rock chips or overburden may become airborne from drilling method. Wear safety glasses and hard hat and remain at a safe distance from back of drill rig.	
		2	Heavy lifting of cores can cause muscle strain.	Always use 2 people to move core containers. Use caution moving core samples to layout area. Plan layout area to ensure adequate aisle space between core runs for logging. Keep back straight and use job rotation.	
11	Sample collection and processing	1	Injuries can result from pinch points on sampling equipment, and from breakage of sample containers.	Care should be taken when opening sampling equipment. Look at empty containers before picking them up, and do not over-tighten container caps. Use dividers to store containers in the cooler so they do not break.	Sample Cooler Handling JSA
		2	Lifting heavy coolers can cause back injuries.	Use two people to move heavy coolers. Use proper lifting techniques.	
12	Monitoring well installation	1	Same hazards as in Step 3 with general drill rig operation	See step 3	
		2	Monitoring well construction materials can clutter the work area causing tripping hazards.	Well construction materials should be picked up during the well installation process.	
		3	Heavy lifting can cause muscle strains, and cutting open bags can cause lacerations.	Well construction materials are usually 50 lbs or greater. Team lift or use drill rig to hoist bags. Always use work gloves while cutting open bags.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		4	Well pack material (i.e. sand, grout, bentonite) can become airborne and get in your eyes.	Wear safety glasses for protection from airborne sand and dust.	
		5	Cutting the top of the well to size can cause jagged/sharp edges on the top of the well casing.	Wear gloves when working with the top of the well casing, and file any sharp jagged edges that resulted from cutting to size.	
13	Soil cutting and purge water management	1	Moving full drums can cause back injury, or pinching/crushing injury.	Preferably have the drilling contractor move full drums with their equipment. If this is not practicable, use lift assist devices such as drum dollies, lift gates, etc. Employ proper lifting techniques and identify pinch/crush points. Wear leather work gloves, and clear all walking and work areas of debris prior to moving a drum.	Drum Handling JSA

Table B3 - PPE Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)	leather	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Required
Miscellaneous PPE	traffic vest--Class II or III		Required
Respiratory Protection	dust mask		Recommended

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)	Driller to provide and manage	Recommended
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
Personal	eye wash (specify type)	bottle	Required
	water/fluid replacement		Recommended
Traffic Control	traffic cones		Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**		

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Attachment C – PPE Equipment Lists

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Table C1 - PPE Checklist

R = Equipment required to be present on the site. **O** = Optional equipment. Subcontractors must have the same equipment listed here as a minimum.

Description (Put Specific Material or Type in Box)	Level Of Protection		
	D	C	B
Body			
Coveralls			
Chemical Protective Suit (include type in cell, e.g., Tyvek, Saranex, PVC, etc.)			
Splash Apron			
Rain Suit			
Traffic Safety Vest (reflective)			
Head			
Hard Hat (if does not create other hazard)			
Head Warmer (depends on temperature and weather conditions)			
Eyes & Face			
Safety Glasses (incorporate sun protection as necessary)			
Goggles (based on hazard)			
Splash Guard (based on hazard)			
Ears			
Ear Plugs			
Ear Muffs			
Hands and Arms			
Outer Chemical Resistant Gloves (specify the type of glove based on chemical hazard)			
Inner Chemical Resistant Gloves (specify the type of glove based on chemical hazard)			
Insulated Gloves			
Work Gloves*			
Foot			
Safety Boots (steel toe and shank)			
Rubber, Chemical Resistant Boots			
Rubber Boots			
Disposable Boot Covers			
Respiratory Protection			
1/2 Mask APR			
Full Face APR			
Dust Protection			
Powered APR			
SCBA			
Air Line			

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Attachment D – Material Safety Data Sheets (MSDSs)

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Material Safety Data Sheets should be added once the Phase II Environmental Site Assessment Scope of Work has been defined.

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Attachment E – Health and Safety Plan (HASP) Forms

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Form E1 – Tailgate Health and Safety Meeting Form

TAILGATE HEALTH & SAFETY MEETING FORM

This form documents the tailgate meeting conducted in accordance with the Project HASP. Personnel who perform work operations on-site during the day are required to attend this meeting and to acknowledge their attendance, at least daily.

Project Name:			**Project Location:**
Date:	**Time:**	**Conducted by:**	**Signature/Title:**
Client:		**Client Contact:**	**Subcontractor companies:**

TRACKing the Tailgate Meeting

Think through the Tasks (list the tasks for the day):

1 _____ 3 _____ 5 _____

2 _____ 4 _____ 6 _____

Other Hazardous Activities - Check the box if there are any other ARCADIS, Client or other party activities that may pose hazards to ARCADIS operations ☐ If there are none, write "None" here: _____

If yes, describe them here: _____

How will they be controlled? _____

Prework Authorization - check activities to be conducted that require permit issuance or completion of a checklist or similar before work begins:

	Doc #		Doc #		Doc #
☐ Not applicable		☐ Working at Height		☐ Confined Space	
☐ Energy Isolation (LOTO)		☐ Excavation/Trenching		☐ Hot Work	
☐ Mechanical Lifting Ops		☐ Overhead & Buried Utilities		☐ Other permit	

Discuss following questions (for some review previous day's post activities). **Check if yes :**

☐ Topics from Corp H&S to cover?		
☐ Incidents from day before to review?	☐ Lessons learned from the day before?	☐ Any Stop Work Interventions yesterday?
☐ Any corrective actions from yesterday?	☐ Will any work deviate from plan?	☐ If deviations, notify PM & client
☐ JLAs or procedures are available?	☐ Field teams to "dirty" JLAs, as needed?	☐ All equipment checked & OK?
☐ Staff has appropriate PPE?	☐ Staff knows Emergency Plan (EAP)?	☐ Staff knows gathering points?

Comments: _____

Recognize the hazards (check all those that are discussed) (Examples are provided) and **Assess** the Risks (Low, Medium, High - circle risk level) - Provide an overall assessment of hazards to be encountered today and briefly list them under the hazard category.

☐ Gravity (i.e., ladder, scaffold, trips) (L M H)	☐ Motion (i.e., traffic, moving water) (L M H)	☐ Mechanical (i.e., augers, motors) (L M H)
☐ Electrical (i.e., utilities, lightning) (L M H)	☐ Pressure (i.e., gas cylinders, wells) (L M H)	☐ Environment (i.e., heat, cold, ice) (L M H)
☐ Chemical (i.e., fuel, acid, paint) (L M H)	☐ Biological (i.e., ticks, poison ivy) (L M H)	☐ Radiation (i.e., alpha, sun, laser) (L M H)
☐ Sound (i.e., machinery, generators) (L M H)	☐ Personal (i.e. alone, night, not fit) (L M H)	☐ Driving (i.e. car, ATV, boat, dozer) (L M H)

Continue TRACK Process on Page 2

TAILGATE HEALTH & SAFETY MEETING FORM - Pg. 2

Control the hazards (Check all and discuss those methods to control the hazards that will be implemented for the day): Review the HASP, applicable JLAs, and other control processes. Discuss and document any additional control processes.

☒ **STOP WORK AUTHORITY** (Must be addressed in every Tailgate meeting - (*See statements below*)

☐ Elimination	☐ Substitution	☐ Isolation
☐ Engineering controls	☐ Administrative controls	☐ Monitoring
☐ General PPE Usage	☐ Hearing Conservation	☐ Respiratory Protection
☐ Personal Hygiene	☐ Exposure Guidelines	☐ Decon Procedures
☐ Emergency Action Plan (EAP)	☐ Fall Protection	☐ Work Zones/Site Control
☐ JLA to be developed/used *(specify)*	☐ LPO conducted *(specify job/JLA)*	☐ Traffic Control
☐	☐	☐ Other *(specify)*
☐	☐	☐

Signature and Certification Section - Site Staff and Visitors

Name/Company/Signature	Initial & Sign in Time	Initial & Sign out Time	I have read and understand the

Important Information and Numbers

All site staff should arrive fit for work. If not, they should report to the supervisor any restrictions or concerns.

In the event of an injury, employees will call WorkCare at 1.800.455.6155 and then notify the field supervisor who will, in turn, notify Corp H&S at 1.720.344.3844.

In the event of a motor vehicle accident, employees will notify the field supervisor who will then notify Corp H&S at 1.720.344.3844 and then Corp Legal at 1.720.344.3756.

In the event of a utility strike or other damage to property of a client or 3rd party, employees will immediately notify the field supervisor, who will then immediately notify Corp Legal at 1.678.373.9556 and Corp H&S at

Visitor Name/Co - not involved in work

	In	Out
	In	Out
	In	Out
	In	Out

I will STOP the job any time anyone is concerned or uncertain about health & safety or if anyone identifies a hazard or additional mitigation not recorded in the site, project, job or task hazard assessment.

I will be alert to any changes in personnel, conditions at the work site or hazards not covered by the original hazard assessments.

If it is necessary to **STOP THE JOB**, I will perform **TRACK**; and then amend the hazard assessments or the HASP as needed.

I will not assist a subcontractor or other party with their work unless it is absolutely necessary and then only after I have done TRACK and I have thoroughly controlled the hazard.

Post Daily Activities Review - Review at end of day or before next day's work (Check those applicable and explain:)

- ☐ Lessons learned and best practices learned today: _____
- ☐ Incidents that occurred today: _____
- ☐ Any Stop Work interventions today? _____
- ☐ Corrective/Preventive Actions needed for future work: _____
- ☐ Any other H&S issues: _____

Keep H&S 1st in all things

WorkCare - 1.800.455.6155

Form E2 – Real Time Exposure Monitoring Data Collection Form

Real Time Exposure Monitoring Data Collection Form

Document all air monitoring conducted on the Site below. Keep this form with the project file.

Site Name: _____ Date: _____

Instrument: _____ Model: _____ Serial #: _____

Calibration Method: (Material used settings, etc.)	
Calibration Results:	
Calibrated By:	

Activity Being Monitored	Compounds/Hazards Monitored	Time	Reading	Action Required? Y/N

Describe Any Actions Taken as a Result of this Air Monitoring and Why (does it match Table 5-1):

_____

_____

Form E3 – Hazardous Materials Transportation Form

Hazardous Materials Transportation Form

	Vehicle (place X in box)	Type (pick-up, car, box truck, etc.)
Personal		
Rental		
ARCADIS owned/leased		
Government owned		
Trailer		

Materials Transported	Quantity	Storage/Transport Container

List Trained Drivers:

_____

_____

Form E4 – Hazardous Material Shipment Form

Hazardous Materials Shipment Form

Material Description and Proper Shipping Name (per DOT or IATA)	Shipment Quantity	DOT Hazard Classification	Shipment Method (air/ground)

List Shipper (i.e., who we are offering the shipment to):

_____

_____

List Trained Employee(s):

_____

_____

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Attachment F – Visitor Acknowledgement and Acceptance

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Form F1 - Visitor Acknowledgement and Acceptance of HASP Signature Form

By signing below, I waive, release and discharge the owner of the site and Contractor and their employees from any future claims for bodily and personal injuries which may result from my presence at, entering, or leaving the site and in any way arising from or related to any and all known and unknown conditions on the site.

Name	Company	Reason for Visit	Date/Time On Site	Date/Time Off Site

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Attachment G – Emergency Action Plan

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Attachment H – Employee and Subcontractor Signature Form

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Form H1 - Employee Signature Form

I certify that I have read, understand, and will abide by the safety requirements outlined in this HASP.

Printed Name	Signature	Date

Form H2 - Subcontractor Acknowledgement: Receipt of HASP Signature Form

Contractor claims no responsibility for the use of this HASP by others although subcontractors working at the site may use this HASP as a guidance document. In any event, Contractor does not guarantee the health and/or safety of any person entering this site. Strict adherence to the H&S guidelines provided herein will reduce, but not eliminate, the potential for injury at this site. To this end, health and safety becomes the inherent responsibility of personnel working at the site.

Printed Name	Company	Signature	Date

Attachment I – 2016 Traffic Control Plan and Construction Management Plan

(Sample shown – to be replaced with actual TCP or CMP)

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Form I1 – Traffic Control Plan/Site Traffic Awareness and Response Plan

Traffic Control Plan/Site Traffic Awareness and Response Plan
Revision 8, 10/15/2015

1.0 General

Plan type	Select
Project Name:	
Project Number:	
Developer Name:	
Not Applicable	
Not Applicable	
Not Applicable	
Not Applicable	
Not Applicable	
Not Applicable	

Comments:

2.0 Work Description

Provide a brief description of scope of work:

3.0 Type and Duration

Work locations on this project will be: Select

Special traffic conditions may include (select most prevalent): Not applicable

4.0 Traffic Control Layout, Number of Devices Required and Phasing

The following pedestrian requirements in the Field Guide to RWZ Safety applies:

Select the traffic control devices to be used and enter number each required:

Check all that apply:	*Wording or Pictogram*	*Number:*
☐ Warning signs	_____	_____
☐ Warning signs	_____	_____
☐ Warning signs	_____	_____
☐ Stop/Slow paddle		_____
☐ Red flag		_____
☐ Drums		_____
☐ Channelizer cone (42 inch height, 10 lb base)		_____
☐ Channelizer cone (42 inch height, 30 lb base)		_____
☐ Traffic cones (≥ 18 inches tall)		_____
☐ Barricade ☐ Type I ☐ Type II		_____
☐ Flags for cones		_____
☐ Lights (for night work)		_____
☐ Plastic fencing (rolls)		_____
☐ Caution tape (rolls)		_____
☐ Other (specify):		_____
_____		_____
_____		_____
_____		_____
_____		_____
_____		_____
_____		_____
_____		_____

5.0 Approvals

Plan Developer: _____

HASP Reviewer _____

SOUTH STATION
EXPANSION

Appendix C-3 Site Specific Health and Safety Plan – Readville – Yard 2

June 2016

massDOT
Massachusetts Department of Transportation

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Site Specific Health and Safety Plan – Readville – Yard 2

TBD

Designated Health and Safety (H&S) Plan Writer

TBD

Designated Health and Safety (H&S) Plan Reviewer

TBD

Project Manager

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Foreword

The following Health and Safety Plan (HASP) has been prepared in accordance with the Occupational Safety and Health Administration's (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard, 29 CFR 1910.120. This HASP is applicable to the future Phase II Environmental Site Assessment (ESA) activities planned for the Readville – Yard 2 site. At the time of preparation of this HASP, a Phase II ESA Scope of Work (SOW) has not been prepared for the site. Therefore, there are several sections of the following HASP that will require review once the Phase II ESA SOW is finalized. The sections requiring potential revisions are identified in the text of the HASP and include, but are not limited to, emergency contact information, job safety analyses, personnel exposure monitoring, and client specific health and safety (H&S) requirements.

1. Introduction

This HASP has been prepared for the Phase II ESA work planned for Readville – Yard 2 site, located in Boston, Massachusetts. The work on this project will be carried out in compliance with Contractor's H&S Standards, and the Occupational Safety and Health Administration's (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) regulation. Specific H&S information for the project is contained in this HASP. All personnel working on hazardous operations or in the area of hazardous operations shall read and be familiar with this HASP before doing any work. All project personnel shall sign the certification page acknowledging that they have read and understand this HASP.

Changes in the scope of the project or introduction of new hazards to the project shall require revision of the HASP by the HASP writer and reviewer, and approval by the Project Manager (PM). The HASP Addendum Form and Log Table are included as Attachment A.

2. Emergency Contact Information and Procedures

Table 1 presents the Emergency Contact Information associated with the planned Phase II ESA work. List the appropriate Contractor PM, Contractor H&S Manager, and Client H&S Contact once they have been identified. The information in Table 1 should be revised, if necessary, upon review of the Phase II ESA SOW and prior to initializing the Phase II ESA activities.

Table 1 — Emergency Contact Information

Contact	Contact Information
Local Police – Boston Police	911 and 617-343-5600
MBTA Transit Police	617-222-1212
Local Ambulance – Boston Fire Department	911 and 617-364-9677
Local Fire Department – Boston Fire Department	911 and 617-364-9677
Local Hospital: Boston Medical Center	617-313-1132
Local Weather Data	Weather.com
Poison Control	800-332-3073
National Response Center (all spills in reportable quantities)	800-424-8802
U.S. Coast Guard (spills to water)	800-424-8802
Team PM	TBD
Team H&S Manager	TBD
Client H&S Contact	TBD

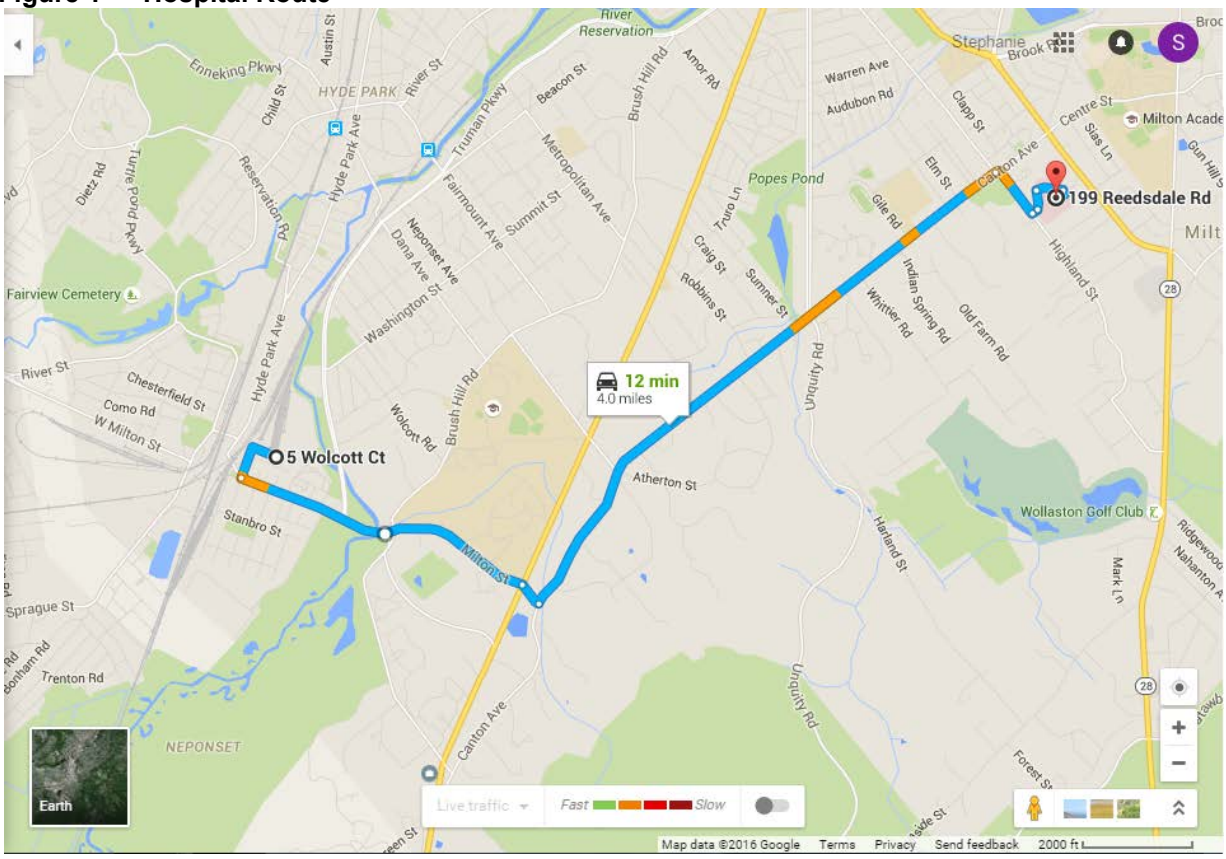
Table 2 presents the location of and directions to the nearest hospital with emergency medicine capabilities should transportation be required during the completion of the Phase II ESA work. The information in Table 2 should be revised, if necessary, upon review of the Phase II SOW and prior to initializing the Phase II ESA activities.

Table 2 —Hospital Locations and Directions

Medical Facility	Beth Israel Deaconess Hospital
Address	199 Reedsdale Road, Milton, Massachusetts 02189
Phone Number	617-313-1132

1. Head northwest on Wolcott Court towards Wolcott Street.
2. Turn left onto Neponset Valley Parkway.
3. Slight left onto Milton Street.
4. Milton Street turns slightly right and becomes Dollar Lane.
5. Turn left onto Canton Avenue, continue for 2.2 miles.
6. Turn right onto Highland Street.
7. Turn left at into Beth Israel Deaconess Hospital, 199 Reedsdale Road, Milton, MA 02186.

Figure 1 — Hospital Route



2.1 Emergency Notification Procedure for the Project

1. Dial 911 (if necessary).
2. Contact Project Manager (PM)/Task Manager (TM).
3. Contact Team H&S Coordinator.
4. Contact Client H&S Contact.

2.2 Emergency Supplies and Equipment List

Table 3 presents the appropriate Emergency Supplies and Equipment List for the planned Phase II ESA work. Select the appropriate supplies and equipment based on the proposed work. The information in Table 3 should be revised, if necessary, upon review of the Phase II SOW and prior to initializing the Phase II ESA activities.

Table 3 — Emergency Supplies and Equipment List

Emergency Supplies and Equipment (check all that apply)	Location on Project Site
☒ First Aid Kit (type):	TBD
☒ Fire Extinguisher	TBD
☒ Mobile Phone ☐ Satellite Phone	TBD
☒ Traffic Cones	TBD
☐ Walkie Talkies	
☐ Water or Other Fluid Replenishment	
☐ Eye Wash/Quick Drench Station	
☒ Eye Wash Bottle	TBD
☐ Wash and Dry Towelettes	
☐ Sunscreen (SPF 15 or higher)	
☐ Insect Repellant	
☒ Chemical Spill Kit	TBD
☐ *Other (specify):*	

3. Project and Site History Requirements

3.1 Site Background

The Readville – Yard 2 is generally located on property currently owned by the Massachusetts Bay Transportation Authority (MBTA) and the Commonwealth of Massachusetts. This area has been used as a rail yard storage and maintenance area since the early 1900s. The expanded rail yard facility will be partially located on a private parcel adjacent to the MBTA property, which also been historically and presently used as a scrap and junk yard for old cars and metal debris.

3.2 Site Description

The majority of the expanded rail yard will be located on property that is currently a MBTA rail layover and maintenance facility. The existing MBTA property has 12 layover tracks, paved roads, and a full maintenance building for train repairs. This is an active rail yard secured by a perimeter fence and generally flat. The adjacent private parcel is presently being used by the James Grant Company for a metal recycling facility and storage.

Table 4 lists various site types which can have an effect on HASP requirements for the planned Phase II ESA work. Select the appropriate characteristics for the site.

Table 4 — Site Type (Check as many as applicable)

X	Active	X	Secure		Industrial		Landfill		Service station
	Inactive	X	Unsecured		Commercial		Well field		Water work
			Uncontrolled		Residential	X	Railroad		Undeveloped
Other specify:									

Based on the completion of a Phase I ESA, several potential Chemicals of Concern (COCs) were identified. These primary COCs include, but may not be limited to, those listed in Table 5.

Table 5 — Primary Chemicals of Concern

Known Compounds	Source (soil/water/drum, etc.)	Known Concentration Range (ppm, mg/kg, mg/l)	
		Lowest	Highest
Polychlorinated biphenyls (PCBs)	Soil	unknown	44.5 mg/kg
Asbestos	Soil	unknown	present
Volatile Petroleum Hydrocarbons	Soil/Water	unknown	unknown
Extractable Petroleum Hydro Carbons	Soil/Water	unknown	3,290 mg/kg (C9-C18 Aliphatic hydrocarbons)
Volatile Organic Compounds	Soil/Water	unknown	unknown
Polyaromatic Hydrocarbons	Soil/Water	unknown	5,870 mg/kg (Benzo(a)pyrene)

3.3 List of Project Tasks and Phase II Scope of Work

1. Task 1 – Subsurface Investigation: Prior to completion of the subsurface investigation activities, a ground penetrating radar survey will be completed.
2. Task 2 – Soil Sampling: A soil sampling program will be conducted to determine the extent of potential impacts at the site. Samples will be obtained via Geoprobe® sampling techniques. Specific safety issues related to Geoprobe or other drilling techniques will be addressed in the Job Safety Analysis (JSA), a sample of which can be found in Attachment B.
3. Task 3 – Groundwater Sampling: An evaluation of the groundwater conditions at the site will include the surveying, gauging and sampling of monitor wells.

4. Contractor Organization and Responsibilities

4.1 All Personnel

Each person is responsible for completing tasks safely, and reporting any unsafe acts or conditions to their supervisor. No person may work in a manner which conflicts with these procedures. Prior to initiating site activities, all Contractor and subcontractor personnel will receive training in accordance with applicable regulations, and be familiar with the requirements and standards referenced in this HASP. In addition, all personnel will attend daily safety meetings (tailgate meetings) to discuss site-specific hazards prior to beginning each day's work. Every Contractor employee, subcontractor, and client representative at the site has the responsibility and authority to **Stop Work** of a coworker or subcontractor if the working conditions or behaviors are considered unsafe by them. When a **Stop Work** occurs, a review of the concerns should be conducted by the crew involved. Should the crew involved not be able to address the **Stop Work** concerns, the Site Safety Officer should be notified to review the conditions. There is no required period of down time for a **Stop Work** and work can commence once the conditions have been reviewed and addressed if necessary.

4.2 Project Manager /Task Manager

The PM is responsible for verifying that project activities are completed in accordance with the requirements of this HASP. The TM is the person generally responsible for the implementation of the field activities and safety on the project site. The PM is responsible for verifying that project activities are completed in accordance with the requirements of this HASP. The PM is responsible for confirming that the project has the equipment, materials, and qualified personnel to fully implement the safety requirements of this HASP, and/or that subcontractors assigned to this project, meet the requirements established by the Contractor. It is also the responsibility of the PM to:

- Review all applicable H&S Standards, and ensure that project activities conform to all requirements;
- Obtain client-specific H&S information and communicate with the client on H&S issues;
- Communicate with the Site Safety Officer (SSO) on H&S issues;
- Allocate resources for correction of identified unsafe work conditions;
- Ensure the Contractor's site workers have all training necessary for the project; and
- Report all injuries, illnesses and near-misses to the client representative, lead incident investigations, and ensure that any recommendations made are implemented.

4.3 Site Safety Officer (SSO)

The SSO has overall responsibility for the technical H&S aspects of the project. Inquiries regarding the Contractor's H&S standards, project procedures, and other technical or regulatory issues should be addressed to this individual. It is also the responsibility of the SSO to:

- Review and work in accordance with the components of this HASP;
- Ensure that this HASP is available to and reviewed by all site personnel including subcontractors;
- Ensure that necessary site-specific training is performed (both initial and "tailgate" safety briefings);
- Ensure site visitors have been informed of the hazards related to the Contractors work;
- Ensure that work is performed in a safe manner and has authority to stop work when necessary to protect workers and/or the public;
- Coordinate activities during emergency situations;
- Ensure that all necessary permits and safety information provided by the client is disseminated to other site personnel and is maintained in an organized manner;
- Communicate with the PM on H&S issues;
- Report all injuries, illnesses and near-misses to the PM;
- Ensure that necessary safety equipment is maintained and used at the site; and
- Contact a H&S professional for assistance in establishing the respiratory cartridge change schedule as required.

An individual can act as more than one role, PM, TM, and/or SSO, during field activities.

5. Project Hazards and Control Measures

5.1 Hazard Analysis

The hazards in the Table 6 below must be ranked using HIGH (H), MEDIUM (M) or LOW (L) based on current site knowledge and Figure 2. For hazards that are not applicable, leave blank. Use the results of this analysis to verify that controls in the Job Safety Analysis (JSA) or other supporting documents are adequate to mitigate task hazards. When in the field, use the Tailgate Safety Meeting Form for task specific evaluation of task hazards.

Table 6 provides various potential hazardous associated with the site, seasonal conditions, and proposed activities for the planned Phase II ESA work. Select the appropriate hazards and the appropriate severity based on the probability and severity the risks based on the proposed work. The information in Table 6 should be revised, if necessary, upon review of the Phase II SOW and prior to initializing the Phase II ESA activities.

Table 6 should be reviewed and approved by the SSO at least every six months or any time site conditions or activities change from the original scope of work associated with this HASP.

Figure 2 — Hazard Ranking Chart

Severity	Consequence		Probability				
	Property Damage	Injury	Frequent	Likely	Occasional	Seldom	Unlikely
	> $100,000	Fatality	H	H	H	H	M
	> $10,000	Injury Requiring Hospitalization	H	H	H	M	L
	> $1000	Injury Requiring Medical Treatment Beyond First Aid	H	M	M	L	L
	< $1000	Injury Requiring First Aid	M	L	L	L	L

Table 6 — Hazard Rankings

Biological		Mechanical		Chemical/Radiation	
L	Biting/stinging insects	L	Cuts on equipment/tools		
L	Biting animals	M	Pinch points on equipment	L	General
L	Poisonous plants		Burns from equipment	H	Dusts, toxic
L	Phys. damaging plants	L	Struck by equipment	L	Dusts, nuisance
				L	Chemicals, Contractor use
Driving		**Motion**		L	Chemicals, corrosive
L	Night driving	L	Lifting/awkward body positions		Chemicals, explosive
M	Off-road driving	H	Struck by vehicle/traffic		Chemicals, flammable
L	Urban driving				Chemicals, oxidizing
	All-terrain vehicle	**Personal Safety**		M	Chemicals, toxic
	Boat		Working late/night		Chemicals, reactive
			Working alone		Radiation, ionizing
Electrical			High crime area		Radiation, non-ionizing
	Wet environments				
L	Electrical panels	**Pressure**		**Compound Specific**	
L	Electric utilities	M	Utilities (gas, water, etc.)	M	Asbestos
	Electric power tools		Compressed gas cylinders	L	Benzene

			Compressed air/aerosols		Cadmium
Environment		M	Hydraulic systems		Hydrogen sulfide
L	Heat			M	Lead
L	Cold	**Sound**			Silica
	Lightning	L	Equipment noise		
	Inclement weather		Tool noise	**Gravity**	
	High wind	L	Traffic noise (vehicle/train/etc.)	M	Slip, trip, fall
					Fall from height
					Ladders or scaffolds
					Struck by falling object

5.2 Job Safety Analyses, Health and Safety Standards, and Personal Protective Equipment

Site specific Job Safety Analyses (JSAs) will be completed for each safety critical task. An example is included in Attachment B. Hazards identified in the table above will be addressed specifically in the JSAs as well as control methods to protect employees and property from hazards. The JSA must lists the type of personal protective equipment (PPE) required for the completion of the project.

- Level D protection is the minimum protection required. Appropriate Level D protective equipment may include: Gloves, coveralls, safety glasses, face shield, and chemical-resistant, steel-toe shoes.
- Level C protection is required when the concentration and type of airborne substances is known and the criteria for using air purifying respirators are met. Typical Level C equipment may include: full-face air purifying respirators, inner and outer chemical-resistant gloves, hard hat, escape mask, and disposable chemical-resistant outer boots.
- Level B protection is required under circumstances requiring the highest level of respiratory protection, with lesser level of skin protection. Examples of Level B protection include: positive pressure, full face-piece self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA; inner and outer chemical-resistant gloves; face shield; hooded chemical resistant clothing; coveralls; and outer chemical-resistant boots.
- Level A protection is required when the greatest potential for exposure to hazards exists, and when the greatest level of skin, respiratory, and eye protection is required. Examples of Level A clothing and equipment include: positive pressure, full face-piece SCBA or positive pressure supplied air respirator with escape SCBA; totally encapsulated chemical- and vapor-protective suit; inner and outer chemical-resistant gloves; and disposable protective suit, gloves, and boots.

A detailed list of PPE for the project is located in Attachment C.

Items for which the contractor should have H&S Standards for this project are listed below. These standards should be reviewed by the PM, TM and site personnel. Prior to initializing the Phase II ESA SOW the potential for client specific JSAs, H&S standards, and PPE requirements need to be reviewed. The Client's H&S Contact should be contacted with any questions concerning the standards, including:

- Utility Location;
- Drilling, Excavation and Trenching;
- Benzene;
- Asbestos;
- Polychlorinated biphenyls (PCBs); and/or

- Lead.

6. Hazard Communication

All project-required chemicals must be handled in accordance with the Contractor's Standard. The table below lists all chemicals that will be brought, used, and/or stored on the site by Contractor's and/or its subcontractors. Material Safety Data Sheets (MSDS) for chemicals brought on site are included in Attachment D. In Table 7 below, list the chemicals anticipated to be used by the Contractor on this project subject to HazCom requirements. Modify quantities as needed.

Table 7 provides a list of various chemicals that may be used on site during the activities for the planned Phase II ESA work. Select the appropriate on-site chemicals based on the proposed work and the expected quantities. The information in Table 7 should be revised, if necessary, upon review of the Phase II SOW and prior to initializing the Phase II ESA activities. This list should be revised when any new chemicals are brought onto the site and reviewed every six months during the project to ensure it is accurate.

Table 7 — On-Site Chemicals

	Acids/Bases	Qty.		Decontamination	Qty.		Calibration	Qty.
☐	Not applicable		☐	Not applicable		☐	Not applicable	
☐	Hydrochloric acid		☐	Alconox		☐	Isobutylene/air	
☐	Nitric acid		☐	Liquinox		☐	Methane/air	
☐	Sulfuric acid		☐	Acetone		☐	Pentane/air	
☐	Sodium hydroxide		☐	Methanol		☐	Hydrogen/air	
☐	Zinc acetate		☐	Hexane		☐	Propane/air	
☐	Ascorbic acid		☐	Isopropyl alcohol		☐	Hydrogen sulfide/air	
☐	Acetic acid		☐	Nitric acid		☐	Carbon monoxide/air	
☐	Other:		☐	Other:		☐	pH standards (4,7,10)	
						☐	Conductivity standards	
						☐	Other:	
	Fuels	**Qty.**		**Kits**	**Qty.**			
☐	Not applicable		☐	Not applicable				
☐	Gasoline		☐	Hach			Specify:	
☐	Diesel		☐	DTECH			Specify:	
☐	Kerosene		☐	EPA 5035 Soil			Specify:	
☐	Propane		☐	Other:				
☐	Other:							
	Remediation	**Qty.**					**Other:**	**Qty.**
☐	Not applicable					☐	Not applicable	
☐	Other:					☐	Spray paint	
☐	Other:					☐	WD-40	
☐	Other:					☐	Pipe cement	
☐	Other:					☐	Pipe primer	
☐	Other:					☐	Mineral spirits	

7. Chemical Hazards

As required, air monitoring will be conducted and as outlined in this HASP to collect exposure data for COCs or for chemicals brought onsite for use. Table 8 lists the properties of chemicals that will be encountered at the site.

Table 8 — Chemical Hazard Information

Chemical Name	IP (eV)	Routes of Entry/ Exposure Symptoms	8-hr TWA[a] (ppm)	IDLH[b] (NIOSH) (ppm)	STEL (ppm)	Source TLV/PEL
PCBs		Inhalation, absorption	.5 mg/m3	5 mg/ m3	.5 mg/m3	.5 mg/m3
Lead	NA	inhalation	.05 mg/m3	100 mg /m3	Not Listed	.05 mg/m3
Asbestos		Inhalation	0.1 fibers/cm3	Not Listed	1.0 fibers/cm3	0.1 fibers/cm3

NA – Not Applicable

[a] The Threshold Limit Value (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH) is listed unless the Permissible Exposure Limit (PEL), designated by OSHA, is lower.

[b] Immediately Dangerous To Life or Health (IDLH) per the National Institute for Occupational Safety and Health (NIOSH).

See Section 9 for information on air monitoring requirements.

8. Tailgate Meetings

Tailgate safety briefings must be conducted at least once daily and should be conducted twice daily (at the start of the job and after midday meal break), or as tasks/hazards change. Each tailgate safety briefing must be documented on the form included in Attachment E and maintained with the project files. The tailgate safety briefing will serve as a final review for JSAs, hazard identification and controls to be utilized.

9. Personal Exposure Monitoring and Respiratory Protection

This section has been provided should personal exposure monitoring and respiratory protection be required. Based on the final Phase II SOW, the Team H&S Manager will determine the necessity of this section. This determination is to be conducted prior to implementing the Phase II ESA SOW.

Personal and area exposure monitoring will be documented on the Real Time Exposure Monitoring Data Form provided in Attachment E. All monitoring equipment will be maintained and calibrated in accordance with manufacturer's recommendations. All pertinent monitoring data will be logged on the form and maintained on site for the duration of project activities. Calibration of all monitoring equipment will be conducted daily and logged on the same form.

Table 9 lists exposure monitoring requirements and associated action levels for site exposure hazards (e.g. chemical, noise, radiation, etc.). Action levels have been developed for exposure monitoring with real-time air monitoring instruments as specified in the table. Air monitoring data will determine the required respiratory protection levels at the Site during scheduled intrusive activities. The action levels are based on sustained readings indicated by the instrument(s). Air monitoring will be performed and recorded at up to 30-minute intervals.

If elevated concentrations are indicated, the monitoring frequency will be increased, as appropriate. If sustained measurements are observed during this time, the following actions will be instituted, and the PM and Project Health and Safety Manager will be notified. For purposes of this HASP, sustained readings are defined as the average airborne concentration maintained for a period of one (1) minute.

Table 9 — Exposure Monitoring Requirements

TASK 1 – Is exposure monitoring required for the completion of this task? ☐ YES ☐ NO If yes, complete the following:				
Exposure Hazard	**Monitoring Equipment**	**Monitoring Frequency**	**Action Level**	**Required Action**
TBD				
TASK 2 – Is exposure monitoring required for the completion of this task? ☐ YES ☐ NO If yes, complete the following:				
Exposure Hazard	**Monitoring Equipment**	**Monitoring Frequency**	**Action Level**	**Required Action**
TBD				
TASK 3 – Is exposure monitoring required for the completion of this task? ☐ YES ☐ NO If yes, complete the following:				
Exposure Hazard	**Monitoring Equipment**	**Monitoring Frequency**	**Action Level**	**Required Action**
TBD				

9.1 Respirator Cartridge Change Schedule

Respirators will be stored in clean containers (i.e., self-sealing bag) when not in use. If respirators are required to be worn based on the action levels established above, respirator cartridges will be replaced in accordance with the following change-out schedule.

Table 10 — Respirator Cartridge Change Schedule

Type of Cartridge	Cartridge Change-out Schedule
Particulate (i.e., High Efficiency Particulate Air)	At least weekly or whenever the employee detects an increase in breathing resistance. This will occur as the filter becomes loaded with particulate matter.
Sorbent (i.e., organic vapor)	At the end of each day's use or sooner, if the respirator manufacturer change-out schedule software program dictates otherwise. The Project H&S Manager or the PM must be consulted regarding gas/vapor cartridge change-out schedule. This will be determined per the Contractors Respiratory Protection standard.

Personnel who wear air purifying respirators (APRs) must be trained in their use, must have successfully passed a qualitative respiratory fit test within the last 12 months, and must have medical clearance for APR use.

With the exception of protection against particulates[1], if the action plan outlined above calls for an upgrade to an air-purifying respirator (for protection against organic vapors and other gaseous chemicals), the following will apply:

[1] Cartridge Change Schedule is not necessary for cartridges used in the protection against particulates provided that the cartridges are changed out when there is a perceived resistance in breathing experienced by the user.

- The respirator cartridge will be equipped with an end-of-service-life indicator (ESLI) certified by National Institute for Occupational Safety and Health (NIOSH) for the contaminant; or
- If there is no ESLI appropriate for a contaminant, the project will implement a change schedule for cartridges to ensure that they are changed before the end of their service life.

10. Medical Surveillance

Medical surveillance requirements are outlined in the Contractor Medical Monitoring Standard. All medical surveillance requirements as indicated must be completed and site personnel medically cleared before being permitted on the project site.

11. General Site Access and Control

The SSO will coordinate access and control security at the work site. As the work dictates, the SSO will establish a work area perimeter. The size of the perimeter will be based on the daily task activities and will be discussed with all project personnel during the tailgate meeting and then documented on the tailgate meeting form. Control zones for Level C or above, as described previously, will be demarcated by either visual or physical devices and will be monitored for effectiveness by the SSO.

Only authorized personnel will be allowed beyond the perimeter. Other site workers and visitors to the site should be kept out of the work site. If visitors need access to the site, the SSO will escort the visitor at all times. All visitors will log in and out with the SSO. The visitor log sheet is included in Attachment F.

11.1 Sanitation at Temporary Workplaces

11.1.1 Potable Water

An adequate supply of potable water must be provided on the site. Portable containers used to dispense drinking water shall be capable of being tightly closed, and equipped with a tap. Water shall not be dipped from containers. Any container used to distribute drinking water shall be clearly marked as to the nature of its contents and not used for any other purpose. Where single service cups (to be used but once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.

Potable water is available at facilities on site.

11.1.2 Toilet Facilities

Under temporary field conditions, the SSO will make provisions so that no less than one toilet facility is available. Use of a nearby toilet facility is an acceptable arrangement for mobile crews having transportation readily available.

Restroom facilities are available on site.

12. Decontamination Control Zones and Procedures

This section has been provided should decontamination control zones and procedures for Level C or higher be required. Based on the final Phase II SOW, the Team H&S Manager will determine the

necessity of this section and make appropriate revisions. This determination is to be conducted prior to implementing the Phase II ESA SOW.

The zones for Level C and above will be designated by traffic cones, barricades, signs, caution tape, or other means effective in identifying the different areas. The SSO will establish control boundaries for the exclusion zone, contamination reduction zone, and the support zone. The zones will be identified by the SSO during tailgate meetings and documented on the meeting form. Entrance and exit to the exclusion zone will only be through controlled access points established for each work area.

Level B or Level A decontamination procedures are detailed in the table below.

Table 11 — Level A/B Decontamination Steps

Level A Decontamination Steps		Level B Decontamination Steps	
EZ-1	Segregated Equipment Drop	EZ-1	Segregated Equipment Drop
EZ-2	Boot Cover and Glove Wash	EZ-2	Boot Cover and Glove Wash
EZ-3	Boot Cover and Glove Rinse	EZ-3	Boot Cover and Glove Rinse
EZ-4	Tape Removal	EZ-4	Tape Removal
EZ-5	Boot Cover Removal	EZ-5	Boot Cover Removal
EZ-6	Outer Glove Removal	EZ-6	Outer Glove Removal
CRZ-7	Suit/Safety Boot Wash	CRZ-7	Outer Glove Removal
CRZ-8	Suit/Safety Boot Rinse	CRZ-8	Suit/SCBA/Boot/Glove Rinse
CRZ-9	Encapsulated Suit Partial Removal/Tank Change	CRZ-9	Tank Change
CRZ-9a	Redress-return to EZ	CRZ-9a	Redress-return to EZ
CRZ-10	Safety Boot Removal	CRZ-10	Safety Boot Removal
CRZ-11	Encapsulated Suit Removal	CRZ-11	SCBA Removal
CRZ-12	SCBA Removal	CRZ-12	Splash Suit Removal
CRZ-13	Inner Glove Wash	CRZ-13	Inner Glove Wash
CRZ-14	Inner Glove Rinse	CRZ-14	Inner Glove Rinse
CRZ-15	Face-piece Removal	CRZ-15	Face-piece Removal
CRZ-16	Inner Glove Removal	CRZ-16	Inner Glove Removal
CRZ-17	Inner Clothing Removal	CRZ-17	Inner Clothing Removal
SZ-18	Field Wash	SZ-18	Field Wash
SZ-19	Redress	SZ-19	Redress

Zones include:

- EZ-Exclusion Zone – The area of investigation or contamination. No personnel allowed unless appropriate PPE is worn;
- CRZ-Contamination Reduction Zone – The transition area of between contaminated areas and the support zone. Decontamination activities are conducted here; and
- SZ-Support Zone – Non-contaminated areas outside the work zone.

13. Emergency Action Plan (EAP)

An Emergency Action Plan (EAP) will be prepared and approved by the SSO. The EAP will be included in Attachment G. The EAP details the procedures to take in the event that an injury, over-exposure or spill has occurred. The EAP must be approved by the SSO and reviewed by site personnel working under this HASP. All employees working on this project must be shown the location and proper use of all emergency equipment prior to beginning work on the project.

14. Client-Specific Health and Safety Requirements

Prior to implementing the Phase II ESA, the Team H&S Manager should verify that the client does not have specific health and safety requirements that apply to the proposed work. If the client has requirements they should be listed and defined in this section, otherwise thus section can be removed.

Contractor project personnel must comply with the client's specific H&S requirements at all times. Client-specific H&S requirements are as follows:

- (list requirements here)

15. Ground or Air Shipments of Hazardous Materials (HazMat)

All samples, electronic equipment with batteries, powders, gases, liquids, magnetized materials or radioactive materials being shipped by air or ground transport will be evaluated using the appropriate Shipping Determination process to determine if the material or equipment being shipped is hazardous for transport. All materials identified as HazMat will be shipped according to applicable MassDOT and International Air Transport Association (IATA) regulations and requirements as prescribed by the Contractor DOT Program.

All employees collecting samples, preparing HazMat packages, or offering HazMat to a 3rd-party carrier such as FedEx will have current HazMat training.

16. H&S Orientation and Task Improvement Process

As part of any project, no matter how simple or complex, Task Improvement Processes (TIPs) should be conducted when practical and when able to integrate into normal business activities. TIPs should be scheduled based on the risk of the tasks being performed, and should be conducted for different tasks and at different times. Completion of TIPs should be documented on the tailgate meeting form. The following table should be filled out upon completion of TIPs conducted on this project.

Table 12 — TIP Plan

Identified Task for TIP	Schedule Date	Observer Name	Observee Name	Feedback Supervisor Name

17. Subcontractors

A copy of this HASP is to be provided to all subcontractors prior to the start of work so that the subcontractor is informed of the hazards at the site. While the Contractor HASP will be the minimum health and safety requirements for the work completed by Contractor and its subcontractors, each subcontractor, in coordination with Contractor health and safety personnel, is expected to perform its operations in accordance with its own HASP, policies and procedures unique to the subcontractor's work to ensure that hazards associated with the performance of the work activities are properly controlled.

Copies of any required safety documentation for a subcontractor's work activities will be provided to Contractor for review prior to the start of on-site activities.

In the event that the subcontractor's procedures/requirements conflict with requirements specified in this HASP, the more stringent guidance will be adopted after discussion and agreement between the subcontractor and Contractor project health and safety personnel. Hazards not listed in this HASP, but known to the subcontractor or known to be associated with the subcontractor's services, must be identified and addressed to the Contractor project or TM and SSO prior to beginning work operations.

Should Subcontractors working at the site choose to utilize this HASP they will need to have this plan with them, and will also need to sign the Subcontractor HASP receipt signature page of the Contractor HASP (Attachment H). Subcontractors are responsible for the H&S of their employees at all times, and have the authority to **Stop Work** if unsafe conditions arise.

The PM/TM and SSO (or authorized representative) has the authority to halt the subcontractor's operations and to remove the subcontractor or subcontractor's employee(s) from the site for failure to comply with established health and safety procedures or for operating in an unsafe manner.

18. Project Personnel HASP Certification

All site project personnel will sign the certification signature page provided in Attachment H of this HASP.

19. Roadway Work Zone Safety

All project work performed in a public or private roadway, regardless of work duration, will require a either a written Traffic Control Plan (TCP) or a Construction Management Plan (CMP). Projects having work activities on both public and private roadways will operate under a TCP approved by an employee designated with Engineering Judgment. A site specific TCP and/or CMP have been prepared for the site and work conducted as part of the Phase II Scope of Work will conform to them.

Attachment A – Health and Safety Plan (HASP) Addendum and Log Table

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Addendum Page

This form should be completed for new tasks associated with the project. The PM and/or TM should revise the Project Hazard Analysis Worksheet with the new task information and attach to this addendum sheet. JSAs should be developed for any new tasks and attached as well.

Review the addendum with all site staff, including subcontractors, during the daily tailgate briefing, and complete the tailgate briefing form as required. Attach a copy of the addendum to all copies of the HASP including the site copy, and log in the Addendum Log Table A-1 on the next page.

Addendum Number: _____ Project Number: _____

Date of Changed Conditions: _____ Date of Addendum: _____

Description of Change that Results in Modifications to HASP:

Signed: _____ Signed: _____
Project Manager Site Safety Officer

Signed: _____ Signed: _____
H&S Plan Writer H&S Plan Reviewer

Addendum Log Table

Addendums are to be added to every copy of the HASP, and logged on Table A-1 to verify that all copies of the HASP are current:

Table A-1 — Addendum Log Table

Addendum Number	Date of Addendum	Reason for Addendum	Person Completing Addendum
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Attachment B – Job Safety Analysis (JSAs)

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Table B1 - Job Safety Analysis - EXAMPLE

General

JSA ID		**Status**	
Job Name	Environment-Drilling, soil sampling, well installation	**Created Date**	
Task Description	Drilling, soil sampling, and well installation	**Completed Date**	
Template			

Client / Project

Client	
Project Number	
Project Name	
Team PM	
Team Health and Safety Manager	

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer					
HASP Reviewer					

Table B2 - Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Set up necessary traffic and public access controls	1	Struck by vehicle due to improper traffic controls	Use a buddy system for placing site control cones and/or signage. Position vehicle so that you are protected from moving traffic. Wear Class II traffic vest	
2	Utility Clearance	1	Potential to encounter underground or above ground utilities while drilling.	Complete utility clearance in accordance with the Contractor Utility Clearance H&S Standard.	
3	General drill rig operation	1	Excessive noise is generated by rig operation.	When the engine is used at high RPMs or soil samples are being collected, use hearing protection.	
		2	During drill rig operation, surfaces will become hot and cause burns if touched, and COCs in the soils more readily vaporize generating airborne contaminates.	Due to friction and lack of a drilling fluid, heat will be produced during this method. Mainly drill augers. Be careful handling split spoons. Wear proper work gloves. When soils and parts become heated, the COC could volatilize. Air monitoring should always be performed in accordance with the HASP.	
		3	Moving parts of the drilling rig can pull you in causing injury. Pinch points on the rig and auger connections can cause pinching or crushing of body parts.	Stay at least 5 feet away from moving parts of the drill rig. Know where the kill switch is, and have the drillers test it to verify that it is working. Do not wear loose clothing, and tie long hair back. Avoid wearing jewelry while drilling. Cone off the work area to keep general public away from the drilling rig.	
		4	Dust and debris can cause eye injury and soil cuttings and/or water could contain COCs.	Wear safety glasses and stay as far away from actual drilling operation as practicable. Wear appropriate gloves to protect from COCs.	
		5	Drilling equipment laying on the ground (i.e. augers, split spoons, decon equipment, coolers, etc.), create a tripping hazard. Water from decon buckets generate mud and cause a slipping hazard.	Keep equipment and trash picked up, and store away from the primary work area.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		6	The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Clearance H&S Standard for guidance.	
4	Mudd rotary drilling	1	The raised derrick can strike overhead utilities, tree limbs or other elevated items.	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
		2	This technology uses fluid, which collects with sediments in large basin. Fluid can splash out and cause slipping/mud hazard. Liquid mixture can splash into your eyes.	Wear rubber boots if needed, and keep clear of muddy/wet area as much as practicable. If area becomes excessively muddy, consider mud spikes or covering the area with a material that improves traction. Wear safety glasses.	
5	Hollow stem auger drilling	1	All hazards in step 3 apply. Additionally, the raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
		2	Hands or fingers can get caught and crushed if trying to clean by hand or with tools while the auger is still turning.	Auger should always be stopped and clutch disengaged prior to cleaning.	
6	Air Rotary Drilling	1	This drilling method works with high air pressure and can generate flying debris that can strike your body or get in your eyes.	When the drill rig is being driven into media, it will produce flying debris. The flaps behind the drill rig should stay closed whenever possible to reduce the risk of flying debris. Safety glasses and hard hat should always be worn when the drill rig is operating. When penetrating asphalt, protect surrounding cars that may be present to avoid damage to pain or windshields.	
		2	The raise derrick can strike overhead utilities, tree limbs or other elevated items.	Never move this rig with the derrick up. Ensure there is proper clearance to raise the derrick and that you are far enough away from overhead power lines. See the Utility clearance H&S Standard for guidance.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		3	When drilling through bedrock prior to groundwater, dust can be produced from pulverization. Inhalation of dusts/powder can occur.	Supplemental water should be used to manage dust and/or dust masks should be used if necessary.	
7	Reverse rotary drilling	1	This method will use fresh water to pump out drill cuttings through the center of the casing. Water/sediment mixture is generated and could cause contact with impacted soils or groundwater.	Ensure the pit construction can hold the amount of cuttings that are anticipated. Air monitoring should also be used of pit area.	
		2	Fire hydrants are often used for water source. Hydrants deliver water at high pressure. Pressurized water can cause flying parts/debris and excessive slipping hazards.	Water usage from fire hydrants should be cleared with local municipalities prior to use. Only persons that know how to use the hydrant should be performing this task. Ensure all connections are tight, and hose line is not run over to cut by traffic. Any leaks from the hydrant should be reported immediately.	
		3	Settling pit construction can cause tripping hazard from excavated soils, and plastic sheeting can cause slipping.	Cone off the area to keep the general public/visitors away from the settling pit. Ensure proper sloping of excavation.	
		4	The raised derrick can strike overhead utilities, tree limbs or other elevated items.	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
8	Rotosonic drilling	1	Fire hydrants are often used for water source. Hydrants deliver water at high pressure. Pressurized water can cause flying parts/debris and excessive slipping hazards.	Water usage from fire hydrants should be cleared with local municipalities prior to use. Only persons that know how to use the hydrant should be performing this task. Ensure all connections are tight, and hose line is not run over to cut by traffic. Any leaks from the hydrant should be reported immediately.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		2	This method requires a lot of clearance. The drill head can turn 90 degrees to attach to the next drill flight or casing. This usually requires a large support truck to park directly behind the rig. As the drill head raises the new casing flight is angled down at the same time until it can be turned completely vertical.	Ensure sufficient overhead clearance.	
		3	Heavy lifting of cores can cause muscle strain.	Always use 2 people to move core containers. Use caution moving core samples to layout area. Plan layout area to ensure adequate aisle space between core runs for logging. Keep back straight and use job rotation.	
		4	The rotosonic drill head can move very quickly up and down while working on a borehole. Moving parts can strike someone or catch body parts.	The operator and helper must communicate and stay clear of the path of the drill head. The drill utilizes two large hydraulic clamps to continuously hold casings while load/unloading previous casings. Do not wear loose clothing.	
9	Direct push drilling	1	The drill rods will be handled by workers most of the time rather than the rig doing it, therefore pinch points can cause lacerations and crushing of fingers/body parts.	Keep a minimum of 5 feet away from drill rig operation and moving parts.	
		2	The direct push rigs are usually meant to fit in spaces where larger rig can't. Tight spaces can pin workers.	Do not put yourself between the rig and a fixed object. Use Spotters or a tape measure to ensure clearances in tight areas. Pre-plan equipment movement from one location to the next.	
		3	Some direct push equipment is controlled by wireless devices. These controls can fail and equipment can strike workers or cause damage to property.	The drill rig should be used in a large open area to test wireless controls prior to moving to boring locations. The operator of the rig will test the kill switch with wireless remote prior to use. Operator will stay in range of rig while moving so that wireless signal will not be too weak and cause errors to the controls.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		4	Sampling sleeves must be cut to obtain access to soil. Cutting can cause lacerations.	It's preferable to let the driller cut the sleeves open. Many drillers have holders for the sleeve to allow for stability when cutting. If you cut the sleeves, use a hook blade, change blade regularly, and cut away from the body.	
		5	Soil cores may contain contaminated media.	Wear nitrile gloves and safety glasses for protection from contaminated media when logging soil borings.	
10	Rock coring	1	Flying debris can hit workers or cause debris to get in eyes.	Rock chips or overburden may become airborne from drilling method. Wear safety glasses and hard hat and remain at a safe distance from back of drill rig.	
		2	Heavy lifting of cores can cause muscle strain.	Always use 2 people to move core containers. Use caution moving core samples to layout area. Plan layout area to ensure adequate aisle space between core runs for logging. Keep back straight and use job rotation.	
11	Sample collection and processing	1	Injuries can result from pinch points on sampling equipment, and from breakage of sample containers.	Care should be taken when opening sampling equipment. Look at empty containers before picking them up, and do not over-tighten container caps. Use dividers to store containers in the cooler so they do not break.	Sample Cooler Handling JSA
		2	Lifting heavy coolers can cause back injuries.	Use two people to move heavy coolers. Use proper lifting techniques.	
12	Monitoring well installation	1	Same hazards as in Step 3 with general drill rig operation	See step 3	
		2	Monitoring well construction materials can clutter the work area causing tripping hazards.	Well construction materials should be picked up during the well installation process.	
		3	Heavy lifting can cause muscle strains, and cutting open bags can cause lacerations.	Well construction materials are usually 50 lbs or greater. Team lift or use drill rig to hoist bags. Always use work gloves while cutting open bags.	

Table B2 - Job Steps (continued)

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		4	Well pack material (i.e. sand, grout, bentonite) can become airborne and get in your eyes.	Wear safety glasses for protection from airborne sand and dust.	
		5	Cutting the top of the well to size can cause jagged/sharp edges on the top of the well casing.	Wear gloves when working with the top of the well casing, and file any sharp jagged edges that resulted from cutting to size.	
13	Soil cutting and purge water management	1	Moving full drums can cause back injury, or pinching/crushing injury.	Preferably have the drilling contractor move full drums with their equipment. If this is not practicable, use lift assist devices such as drum dollies, lift gates, etc. Employ proper lifting techniques and identify pinch/crush points. Wear leather work gloves, and clear all walking and work areas of debris prior to moving a drum.	Drum Handling JSA

Table B3 - PPE Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)	leather	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Required
Miscellaneous PPE	traffic vest--Class II or III		Required
Respiratory Protection	dust mask		Recommended

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)	Driller to provide and manage	Recommended
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
Personal	eye wash (specify type)	bottle	Required
	water/fluid replacement		Recommended
Traffic Control	traffic cones		Required

Review Comments

Reviewer		Comments
Employee:		
Role		
Review Type		
Completed Date		

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Attachment C – Personal Protective Equipment (PPE) Lists

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Table C1 - PPE Checklist

R = Equipment required to be present on the site. **O** = Optional equipment. Subcontractors must have the same equipment listed here as a minimum.

Description (Put Specific Material or Type in Box)	Level Of Protection		
	D	C	B
Body			
Coveralls			
Chemical Protective Suit (include type in cell, e.g., Tyvek, Saranex, PVC, etc.)			
Splash Apron			
Rain Suit			
Traffic Safety Vest (reflective)			
Head			
Hard Hat (if does not create other hazard)			
Head Warmer (depends on temperature and weather conditions)			
Eyes & Face			
Safety Glasses (incorporate sun protection as necessary)			
Goggles (based on hazard)			
Splash Guard (based on hazard)			
Ears			
Ear Plugs			
Ear Muffs			
Hands and Arms			
Outer Chemical Resistant Gloves (specify the type of glove based on chemical hazard)			
Inner Chemical Resistant Gloves (specify the type of glove based on chemical hazard)			
Insulated Gloves			
Work Gloves*			
Foot			
Safety Boots (steel toe and shank)			
Rubber, Chemical Resistant Boots			
Rubber Boots			
Disposable Boot Covers			
Respiratory Protection			
1/2 Mask APR			
Full Face APR			
Dust Protection			
Powered APR			
SCBA			
Air Line			

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Attachment D – Material Safety Data Sheets (MSDSs)

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Material Safety Data Sheets should be added once the Phase II Environmental Site Assessment Scope of Work has been defined.

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Attachment E – Health and Safety Plan (HASP) Forms

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Form E1 – Tailgate Health and Safety Meeting Form

TAILGATE HEALTH & SAFETY MEETING FORM

This form documents the tailgate meeting conducted in accordance with the Project HASP. Personnel who perform work operations on-site during the day are required to attend this meeting and to acknowledge their attendance, at least daily.

Project Name:			**Project Location:**
Date:	**Time:**	**Conducted by:**	**Signature/Title:**
Client:		**Client Contact:**	**Subcontractor companies:**

TRACKing the Tailgate Meeting

Think through the Tasks (list the tasks for the day):

1 _____ 3 _____ 5 _____

2 _____ 4 _____ 6 _____

Other Hazardous Activities - Check the box if there are any other ARCADIS, Client or other party activities that may pose hazards to ARCADIS operations ☐ If there are none, write "None" here: _____

If yes, describe them here: _____

How will they be controlled? _____

Prework Authorization - check activities to be conducted that require permit issuance or completion of a checklist or similar before work begins:

	Doc #		Doc #		Doc #
☐ Not applicable		☐ Working at Height		☐ Confined Space	
☐ Energy Isolation (LOTO)		☐ Excavation/Trenching		☐ Hot Work	
☐ Mechanical Lifting Ops		☐ Overhead & Buried Utilities		☐ Other permit	

Discuss following questions (for some review previous day's post activities). **Check if yes :**

☐ Topics from Corp H&S to cover?	☐ Incidents from day before to review?	☐ Lessons learned from the day before?
☐ Any Stop Work Interventions yesterday?	☐ Any corrective actions from yesterday?	☐ Will any work deviate from plan?
☐ If deviations, notify PM & client	☐ JLAs or procedures are available?	☐ Field teams to "dirty" JLAs, as needed?
☐ All equipment checked & OK?	☐ Staff has appropriate PPE?	☐ Staff knows Emergency Plan (EAP)?
☐ Staff knows gathering points?		

Comments: _____

Recognize the hazards (check all those that are discussed) (Examples are provided) and **Assess** the Risks (Low, Medium, High - circle risk level) - Provide an overall assessment of hazards to be encountered today and briefly list them under the hazard category.

☐ Gravity (i.e., ladder, scaffold, trips) (L M H)	☐ Motion (i.e., traffic, moving water) (L M H)	☐ Mechanical (i.e., augers, motors) (L M H)
☐ Electrical (i.e., utilities, lightning) (L M H)	☐ Pressure (i.e., gas cylinders, wells) (L M H)	☐ Environment (i.e., heat, cold, ice) (L M H)
☐ Chemical (i.e., fuel, acid, paint) (L M H)	☐ Biological (i.e., ticks, poison ivy) (L M H)	☐ Radiation (i.e., alpha, sun, laser) (L M H)
☐ Sound (i.e., machinery, generators) (L M H)	☐ Personal (i.e. alone, night, not fit) (L M H)	☐ Driving (i.e. car, ATV, boat, dozer) (L M H)

Continue TRACK Process on Page 2

TAILGATE HEALTH & SAFETY MEETING FORM - Pg. 2

Control the hazards (Check all and discuss those methods to control the hazards that will be implemented for the day): Review the HASP, applicable JLAs, and other control processes. Discuss and document any additional control processes.

☒ **STOP WORK AUTHORITY** (Must be addressed in every Tailgate meeting - (*See statements below*)

☐ Elimination	☐ Substitution	☐ Isolation
☐ Engineering controls	☐ Administrative controls	☐ Monitoring
☐ General PPE Usage	☐ Hearing Conservation	☐ Respiratory Protection
☐ Personal Hygiene	☐ Exposure Guidelines	☐ Decon Procedures
☐ Emergency Action Plan (EAP)	☐ Fall Protection	☐ Work Zones/Site Control
☐ JLA to be developed/used *(specify)*	☐ LPO conducted *(specify job/JLA)*	☐ Traffic Control
☐	☐	☐ Other *(specify)*
☐	☐	☐

Signature and Certification Section - Site Staff and Visitors

Name/Company/Signature	Initial & Sign In Time	Initial & Sign out Time	I have read and understand the

Important Information and Numbers

All site staff should arrive fit for work. If not, they should report to the supervisor any restrictions or concerns.

In the event of an injury, employees will call WorkCare at 1.800.455.6155 and then notify the field supervisor who will, in turn, notify Corp H&S at 1.720.344.3844.

In the event of a motor vehicle accident, employees will notify the field supervisor who will then notify Corp H&S at 1.720.344.3844 and then Corp Legal at 1.720.344.3756.

In the event of a utility strike or other damage to property of a client or 3rd party, employees will immediately notify the field supervisor, who will then immediately notify Corp Legal at 1.678.373.9556 and Corp H&S at

Visitor Name/Co - not involved in work

	In	Out
	In	Out
	In	Out
	In	Out

I will STOP the job any time anyone is concerned or uncertain about health & safety or if anyone identifies a hazard or additional mitigation not recorded in the site, project, job or task hazard assessment.

I will be alert to any changes in personnel, conditions at the work site or hazards not covered by the original hazard assessments.

If it is necessary to **STOP THE JOB**, I will perform **TRACK**; and then amend the hazard assessments or the HASP as needed.

I will not assist a subcontractor or other party with their work unless it is absolutely necessary and then only after I have done TRACK and I have thoroughly controlled the hazard.

Post Daily Activities Review - Review at end of day or before next day's work (Check those applicable and explain:)

- ☐ Lessons learned and best practices learned today: _____
- ☐ Incidents that occurred today: _____
- ☐ Any Stop Work interventions today? _____
- ☐ Corrective/Preventive Actions needed for future work: _____
- ☐ Any other H&S issues: _____

Keep H&S 1st in all things

WorkCare - 1.800.455.6155

Form E2 – Real Time Exposure Monitoring Data Collection Form

Real Time Exposure Monitoring Data Collection Form

Document all air monitoring conducted on the Site below. Keep this form with the project file.

Site Name: _____ Date: _____

Instrument: _____ Model: _____ Serial #: _____

Calibration Method: (Material used settings, etc.)	
Calibration Results:	
Calibrated By:	

Activity Being Monitored	Compounds/Hazards Monitored	Time	Reading	Action Required? Y/N

Describe Any Actions Taken as a Result of this Air Monitoring and Why (does it match Table 5-1):

_____

_____

Form E3 – Hazardous Materials Transportation Form

Hazardous Materials Transportation Form

	Vehicle (place X in box)	Type (pick-up, car, box truck, etc.)
Personal		
Rental		
ARCADIS owned/leased		
Government owned		
Trailer		

Materials Transported	Quantity	Storage/Transport Container

List Trained Drivers:

Hazardous Materials Shipment Form

Material Description and Proper Shipping Name (per DOT or IATA)	Shipment Quantity	DOT Hazard Classification	Shipment Method (air/ground)

List Shipper (i.e., who we are offering the shipment to):

_____

_____

List Trained Employee(s):

_____

_____

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Attachment F – Visitor Acknowledgement and Acceptance

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Form F1 - Visitor Acknowledgement and Acceptance of HASP Signature Form

By signing below, I waive, release and discharge the owner of the site and Contractor and their employees from any future claims for bodily and personal injuries which may result from my presence at, entering, or leaving the site and in any way arising from or related to any and all known and unknown conditions on the site.

Name	Company	Reason for Visit	Date/Time On Site	Date/Time Off Site

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Attachment G – Emergency Action Plan

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Attachment H – Employee and Subcontractor Signature Form

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Form H1 - Employee Signature Form

I certify that I have read, understand, and will abide by the safety requirements outlined in this HASP.

Printed Name	Signature	Date

Form H2 - Subcontractor Acknowledgement: Receipt of HASP Signature Form

Contractor claims no responsibility for the use of this HASP by others although subcontractors working at the site may use this HASP as a guidance document. In any event, Contractor does not guarantee the health and/or safety of any person entering this site. Strict adherence to the health and safety guidelines provided herein will reduce, but not eliminate, the potential for injury at this site. To this end, health and safety becomes the inherent responsibility of personnel working at the site.

Printed Name	Company	Signature	Date

Attachment I – 2016 Traffic Control Plan and Construction Management Plan

(Sample shown – to be replaced with actual TCP or CMP)

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Form I1 – Traffic Control Plan/Site Traffic Awareness and Response Plan

Traffic Control Plan/Site Traffic Awareness and Response Plan
Revision 8, 10/15/2015

1.0 General

Plan type	Select
Project Name:	
Project Number:	
Developer Name:	
Not Applicable	
Not Applicable	
Not Applicable	
Not Applicable	
Not Applicable	
Not Applicable	

Comments:

2.0 Work Description

Provide a brief description of scope of work:

3.0 Type and Duration

Work locations on this project will be: Select

Special traffic conditions may include (select most prevalent): Not applicable

4.0 Traffic Control Layout, Number of Devices Required and Phasing

The following pedestrian requirements in the Field Guide to RWZ Safety applies:

Select the traffic control devices to be used and enter number each required:

Check all that apply:	*Wording or Pictogram*	*Number:*
☐ Warning signs		
☐ Warning signs		
☐ Warning signs		
☐ Stop/Slow paddle		
☐ Red flag		
☐ Drums		
☐ Channelizer cone (42 inch height, 10 lb base)		
☐ Channelizer cone (42 inch height, 30 lb base)		
☐ Traffic cones (≥ 18 inches tall)		
☐ Barricade ☐ Type I ☐ Type II		
☐ Flags for cones		
☐ Lights (for night work)		
☐ Plastic fencing (rolls)		
☐ Caution tape (rolls)		
☐ Other (specify):		

5.0 Approvals

Plan Developer: _____

HASP Reviewer _____

SOUTH STATION
EXPANSION

Appendix D - Track Configuration Alternatives Analysis - Tier 2 Screening Technical Report

June 2016

massDOT
Massachusetts Department of Transportation

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1. Introduction

The purpose of this technical report is to summarize the terminal track alternatives analysis for the South Station Expansion (SSX) project including a summary of the work previously conducted as part of the Tier 1 analysis; a description of the alternatives progressed to the Tier 2 analysis; and a discussion of the methodology, criteria, and results of the Tier 2 analysis.

MassDOT advanced two of four terminal track alternatives from the Tier 1 screening into the Tier 2 analysis. Alternative 3 performed better than Alternative 2 in five out of seven rating categories, including stakeholder preference, and will be advanced into preliminary design. The stakeholders that provided their preference were the FRA, Amtrak, and the MBTA.

In fall 2014, a Tier 1 screening analysis of the potential rail alternatives for the SSX project was conducted and provided in the Draft Environmental Impact Report (DEIR) Appendix 2 – *Track Configuration Alternatives Analysis – Tier 1 Screening Technical Report*. The Tier 1 analysis described the existing conditions of the terminal tracks at South Station and detailed the numerous configuration concepts Massachusetts Department of Transportation (MassDOT) considered for the terminal track expansion. A number of unconstrained alternatives were considered that included concepts with unrestricted design standards and few limitations. While these concepts solved many of the functional and operational limitations of South Station, those benefits were eclipsed by the significant construction impacts to major adjacent infrastructure.[1] MassDOT used these findings to develop and analyze a number of alternatives that reflected the constraints of the area and minimized the impacts to the surrounding infrastructure.

Four of these alternatives, referred to as the Constrained Rail Alternatives, were identified and evaluated as part of the DEIR. Each alternative was developed to address particular concerns while attempting to meet the overall project goals. The following briefly describes these alternatives:

- Constrained Rail Alternative 1 was developed with the focus on prioritizing operational flexibility within the terminal and providing a complete redesign of the existing South Station terminal area and existing bus terminal;
- Constrained Rail Alternative 2 was developed with the focus on streamlining operations and completely reconfiguring the existing Tower 1 Interlocking. This alternative adds the new station tracks and platforms to the terminal and provides operational improvements such as parallel moves as a separate mini-terminal in an effort to reduce conflicting movements;
- Constrained Rail Alternative 3 was developed with the focus on minimizing disruptions to existing operations and minimizing the amount of existing infrastructure within the terminal to be rebuilt. This alternative maintains, to the greatest extent possible, the existing platform configuration while adding new tracks and platforms parallel to the existing and allows for maximum platform accessibility; and
- Constrained Rail Alternative 4 was developed with the focus on maximizing the overbuild potential. This alternative consists of a complete redesign of the South Station terminal area without impacting the existing bus terminal while enhancing the opportunity for future overbuild development by prioritizing the location of the overbuild support columns.

Each of these four alternatives was analyzed as part of the DEIR Tier 1 Screening process using five rating criteria. The rating criteria utilized were:

[1] The major infrastructure considered includes: existing South Station headhouse; I-90 Mass Turnpike tunnels and ramps; I-93 and ramps; Central Artery/Tunnel vent buildings; and MBTA Red Line.

- Platform accessibility from each service line;
- Platform berthing lengths;
- Infrastructure maintenance requirements;
- Constructability;[2] and
- Capital cost.

Table 1 presents the findings of the Tier 1 screening of Constrained Rail Alternatives 1 through 4. Due to the major impacts to existing infrastructure and challenges that would be encountered throughout the construction period, including significant service shutdowns, Constrained Rail Alternatives 1 and 4 were deemed "not feasible" and were not advanced beyond the Tier 1 screening.

Table 1 — Summary Tier 1 Screening, Constrained Rail Alternatives 1 through 4

Alternative	Platform Rating		Infrastructure Maintenance Rating	Constructability Rating	Capital Cost Rating
	Accessibility	Berthing			
1	1	1*	3	4	4
2	2*	1*	2*	2	2
3	2*	3	1	1	1
4	4	4	2*	3	3

A rating of 1 indicates the most favorable alternative in comparison to other alternatives for the specific criterion.
A rating of 4 indicates the least favorable alternative in comparison to other alternatives for the specific criterion.
* indicates that the alternatives have equal ratings in this criterion.

Based on the five rating criteria, Constrained Rail Alternatives 2 and 3 were recommended to be advanced into next level of screening.

2. Tier 2 Screening Performance Objectives

The Tier 2 screening considered the following elements as part of the evaluation process: platform accessibility and berthing, ability to meet operations, constructability, and cost. The evaluations of these elements are described in Section 4.

Constrained Rail Alternatives 2 and 3 were both evaluated for their ability to meet future South Station performance objectives, including the need to accommodate future service plans and to meet on-time performance goals:

- **Accommodate future service plans**. By the year 2035, the National Railroad Passenger Corporation (Amtrak) projects 80 weekday revenue trips and 58 weekday non-revenue trips, representing a 100% revenue service increase above current levels. Future 2035 Amtrak operations are based on the Northeast Corridor Intercity Service Alternative: "B-Low 2020-2040" operating plan provided by Amtrak.[3] By 2035, the Massachusetts Bay Transportation Authority (MBTA) projects up to 315 weekday revenue trips and 101 weekday non-revenue trips, representing a 13% revenue service increase above current levels. Projections of train movements in and out of South Station are

[2] Constructability refers to the complexity of design and the impacts on the efforts required for construction, including timelines, costs, and service interruptions.
[3] Northeast Corridor Intercity Service Alternative: "B-Low 2020 – 2040" operating plan provided by Amtrak on November 11, 2013.

estimated to be a total of 554 daily trains by the year 2035, representing an overall increase of 23% above current revenue service levels.[4]

- **Meet On-Time Performance (OTP) Goals.** OTP goals have been established for the South Station complex, which includes the South Station platforms, Tower 1 Interlocking, and the key approach interlockings at Cove on the Northeast Corridor (NEC) and Broad in the Widett Circle/Southampton Street area.

3. Track Configuration Alternatives

The Tier 2 analysis included coordination with MassDOT and with other project stakeholders regarding rail engineering design criteria, including design modifications. In addition, Constrained Rail Alternatives 2 and 3 were evaluated with respect to other SSX project elements, including station layout and design of layover facility sites.

Prior to the Tier 2 Screening, MassDOT advanced certain elements of the designs for Constrained Rail Alternatives 2 and 3 to improve functionality and better address the project goals. These conceptual design advancements included: shifting existing track alignments, adjusting track-to-platform clearances and platform configurations, refining accommodation of the South Station Air Rights (SSAR) project,[5] as well as further refinement of track curvature and special trackwork. These advancements and refinements in the design occur within the existing right-of-way and would not affect the environmental impacts of either alternative.

Both Constrained Rail Alternatives 2 and 3 maintain the existing platform configuration at South Station and expand the terminal track configuration to the east with seven new tracks and four new platforms parallel to the existing tracks. The existing platforms would remain at their current width of 17 feet 6 inches and the new platforms would be 26 feet wide to meet current National Fire Protection Association (NFPA) and Americans with Disabilities Act (ADA) standards.

The following provides a summary description of the alternatives. For further information on Constrained Rail Alternatives 2 and 3, including detailed descriptions, opportunities, and impacts/challenges, please refer to DEIR Appendix 2, *Track Configuration Alternatives Analysis - Tier 1 Screening Technical Report*.

3.1 Constrained Rail Alternative 2 – Streamline Operations

Constrained Rail Alternative 2 was developed with the goal of streamlining daily operations at South Station and includes a complete redesign of Tower 1 Interlocking. The redesign of Tower 1 Interlocking provides for two separate mini-terminals, reducing conflicting movements into the terminal. This alternative layout is illustrated in Figure 1.

In order to accommodate the new configuration of the realigned tracks through Tower 1 Interlocking and to lengthen the platforms as much as possible, all of the existing platforms would require extensions at their ends. In particular, Platform G would require extensive modifications to accommodate future Amtrak trainset lengths. The complete reconfiguration of the existing Tower 1 Interlocking would impact all the mainline tracks, special trackwork, and terminal tracks and would significantly impact existing

[4] 2035 revenue service level weekday train movements are based on Massachusetts Department of Transportation. *Basis of Operations Analysis and Assumptions Verification Report*, Version 3. June 2014.

[5] The South Station Air Rights (SSAR) project is a possible future project (EEA No. 9131) for a development above the South Station headhouse and terminal area. The SSX project alternatives evaluation is independent of the SSAR project, however has taken into account any impacts the project would have on the site if constructed.

service during construction. It would also require the implementation of a new operations plan by the dispatcher for future operations of the terminal.

3.2 Constrained Rail Alternative 3 – Minimize Disruption to Operations

Constrained Rail Alternative 3 was developed with the goal of minimizing the disruption to existing operations of the terminal. The additional terminal tracks are accommodated by adding special trackwork to the existing Tower 1 Interlocking, including an additional ladder configuration on the Dorchester Branch. The Dorchester Branch Second Ladder configuration included in this alternative provides added flexibility in cases of disabled trains or other unexpected activities in the Tower 1 Interlocking area. This added flexiblity provides redundancy that is preferred in larger stations to avoid a case where one disabled train can shut down access to numerous platforms and tracks. This alternative layout is illustrated in Figure 2.

Similar to Constrained Rail Alternative 2, existing Platform G would require extensive lengthening modifications, however, there would be no modifications to the other existing platforms.

By retaining the existing Tower 1 Interlocking with minor modifications, this alternative minimizes the construction staging impacts and allows the current operation plan to remain in place.

3.3 Approach (Setup) Interlockings

This section presents the proposed configuration of the interlockings[6] approaching Tower 1 Interlocking, Cove Interlocking from the east and Broad Interlocking from the south. This concept would apply to both Constrained Rail Alternatives 2 and 3. The proposed future 20-track South Station layout envisions infrastructure that can support multiple trains moving simultaneously through the Tower 1 Interlocking area. This proposed layout would be paired with an operating philosophy that reduces the amount of conflicting movements through the terminal area by making it possible for most trains to use the approach interlockings at Cove and Broad, thereby allowing faster and more efficient crossover moves in preparation of berthing at station platforms. The Cove Interlocking on the NEC allows crossovers to occur at 20-30 mph, versus the speed of 10 mph in the Tower 1 Interlocking area, making the necessary crossover movements more efficient. The proposed universal interlocking at Broad Interlocking would deploy the same philosophy of pushing the conflicting movements to an area of higher-speed crossovers and away from the Tower 1 Interlocking area. This proposed layout would continue to provide the operational flexibility needed in the event of an equipment failure or emergency.

[6] An interlocking is a segment of railroad infrastructure comprised of track, turnouts, and signals linked (interlocked) in a way that allows trains to move from one track to another, or across tracks, safely preventing conflicting train movements. The interlockings enable train dispatchers to route incoming trains over a variety of tracks to/from available station tracks. An approach interlocking is an interlocking leading up to a terminal interlocking and station. Typically, approach interlockings are only a short distance from the terminal and allow trains to switch tracks leading into the terminal to prepare to berth at specific platform tracks. Making these movements at the approach interlocking instead of at the terminal also allows for more efficient operations as the crossing movements can be made at higher speeds while avoiding conflicting movements.

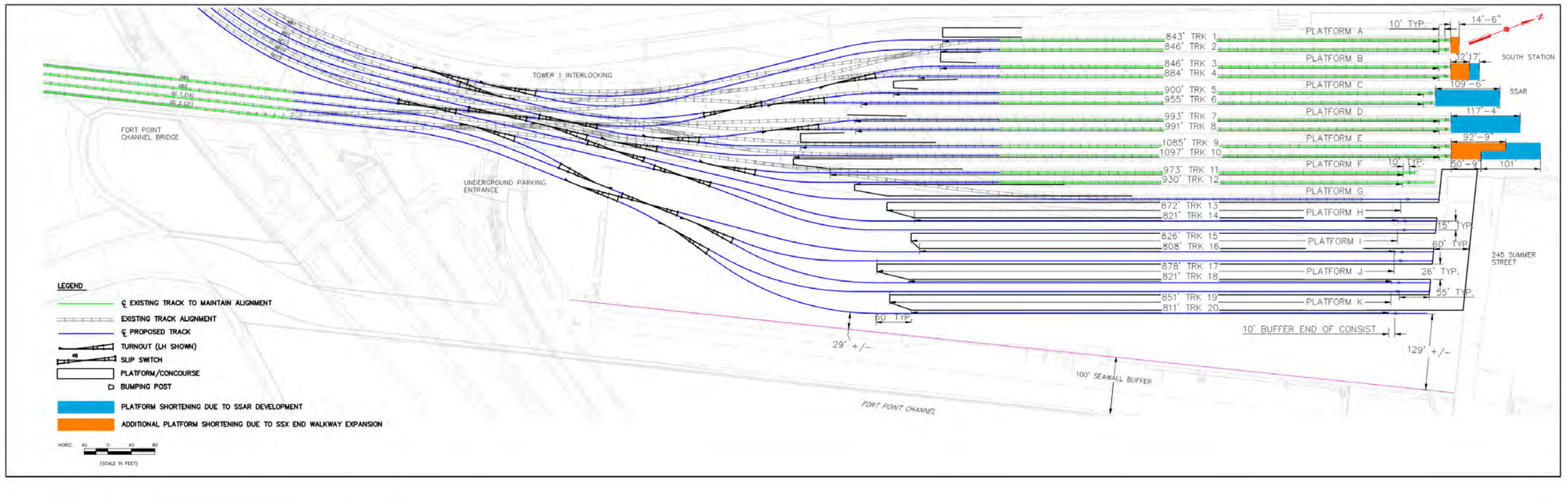

Figure 1 — Constrained Rail Alternative 2 — Streamline Operations

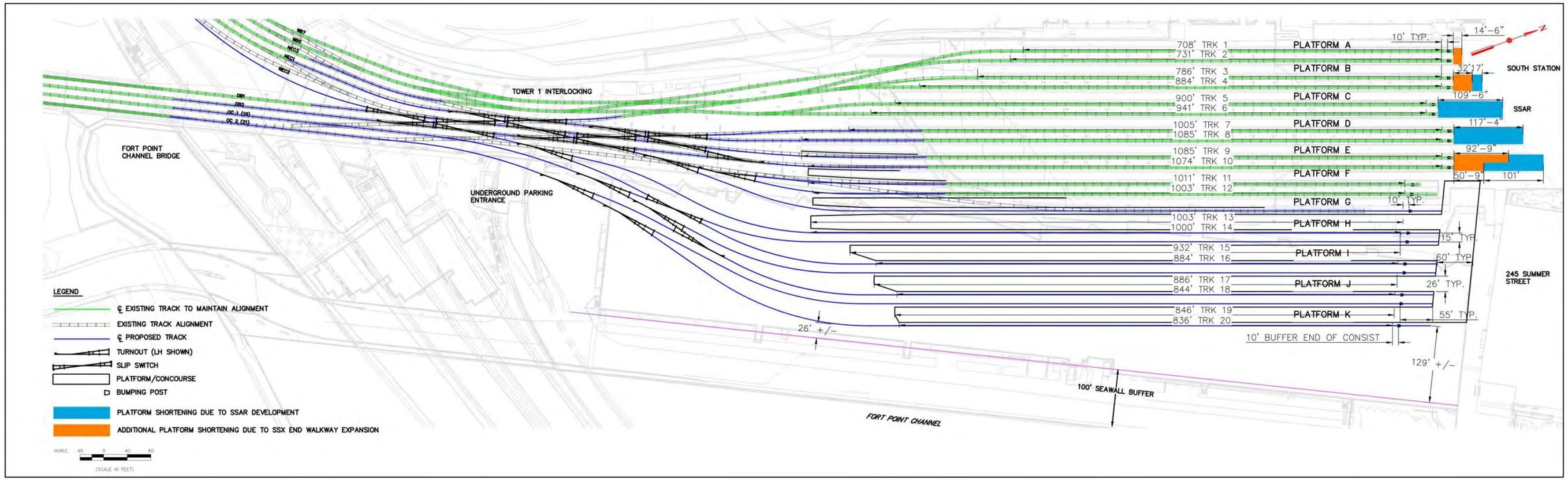

Figure 2 — Constrained Rail Alternative 3 — Minimize Disruptions to Operations

Figure 3 — Broad Interlocking — Proposed Layout

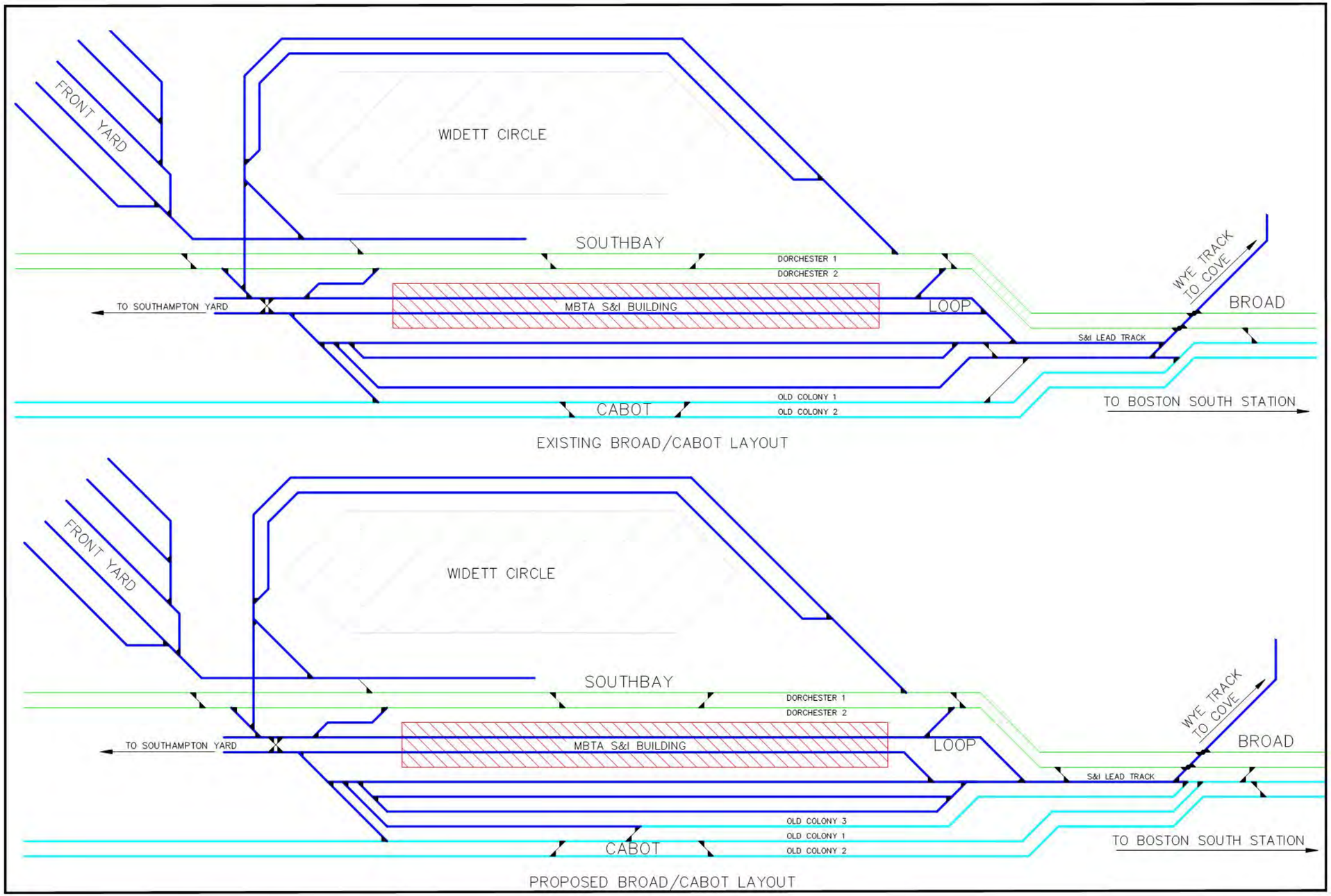

Figure 4 — Broad Interlocking — Proposed Schematic

Broad Interlocking

Broad Interlocking, as illustrated in Figures 3 and 4, would be substantially modified to include the introduction of a third running track (designated OCRR3). This running track would contain an 850-foot minimum section between Cabot and Broad Interlockings that would provide sufficient space to hold one trainset outside of Tower 1 Interlocking. This would help with maintaining speed and maximizing efficient train movements through Tower 1 Interlocking.

Other improvements at Broad Interlocking would include the installation of new universal crossovers, on the north end of the interlocking, in the vicinity of the existing Wye track, to allow moves between DB2 and OC19 and maintain moves to the Wye track and Service and Inspection (S&I) Facility. A new yard lead would be established and the MBTA's S&I Facility yard tracks would be realigned. The proposed track realignment of the Fairmount Line/Dorchester Branch Track 1 and Track 2 may require a small partial acquisition of the Boston Department of Public Works (DPW) Lot and could impact the garage access ramp.

4. Alternatives Screening

4.1 Rating Criteria

This section discusses the rating criteria that were used to screen Constrained Rail Alternatives 2 and 3 in the Tier 2 analysis. Each alternative was graded using a numerical rating of 1 or 2 to evaluate the ability of the alternative to meet the criteria, with 1 being the more favorable alternative to meet system requirements and 2 being the less favorable alternative to meet system requirements. The rating criteria included: platform accessibility and platform berthing, operations, constructability, capital cost, maintenance cost, and stakeholder preference. The criteria listed herein are related to operational and physical characteristics of the rail alternatives.

As stakeholders in the SSX project, the Federal Railroad Administration (FRA), Amtrak, and MBTA were provided opportunities to review and comment on the Constrained Rail Alternatives 2 and 3. Their comments and preferences were important to consider as part of each rating criteria.

4.1.1 Platform Rating

The platform designs of the Constrained Rail Alternatives were rated for their accessibility by each service line and their ability to berth future Amtrak and MBTA trainsets. The goals are to:

- **Provide maximum platform accessibility**. In the case of an emergency or a stopped vehicle, flexibility in platform accessibility is critical. Platform accessibility is measured by the number of station tracks that each service track can access whether the crossover move occurs at the approach interlocking or at Tower 1 Interlocking.
- **Accommodate Amtrak and MBTA platform berthing standards**. In order for a trainset to use any platform, adequate berthing length is required. To accommodate future Amtrak trainsets, platform berthing lengths are desired to be 1,050 feet. To accommodate future MBTA trainsets, platform berthing lengths are desired to be 850 feet. In instances where site restrictions limit the ability to meet the above described length, design modifications may be incorporated into platform design to "extend" platform capabilities to accommodate berthing of Amtrak and MBTA trainsets. These design modifications are depicted in Figure 5.

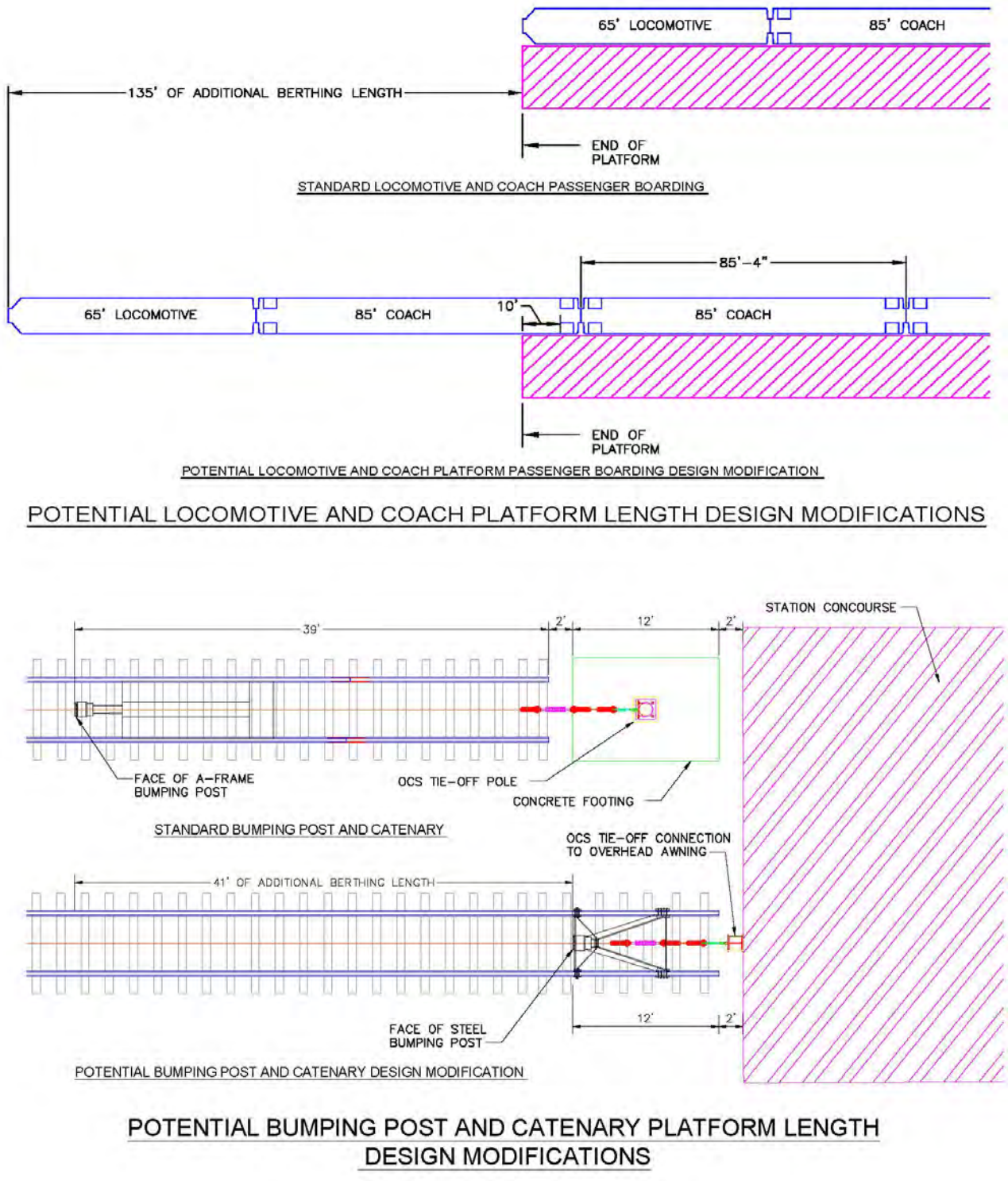

Figure 5 — Potential Berthing Accommodation Design Modifications

4.1.2 Operations Rating

Operations simulation models were developed for each alternative and were evaluated for how each would support future 2035 service levels, as well as on their OTP and delay performance. Additionally, operational efficiencies and limitations of each alternative were identified. FEIR Appendix E, *Rail Operations Analysis Technical Report* details the operations simulation models and the operational efficiencies and limitations.

4.1.3 Constructability Rating

The Constrained Rail Alternatives 2 and 3 were evaluated for their constructability, measured by the degree to which they would minimize impacts to existing infrastructure and minimize disruption to passenger service. The goals are to:

- **Minimize impacts to existing infrastructure**. Existing infrastructure at South Station includes the station tracks and platforms, bus terminal, and foundations for future development (SSAR project).
- **Minimize disruption to passenger service**. South Station is one of the busiest terminals in the Northeast, thus, keeping the trains running during construction with the least impact to their schedules becomes a challenge. It is critical that construction phasing minimize disruption to operations and maximize safety.

4.1.4 Capital Cost Rating

The Constrained Rail Alternatives 2 and 3 were rated according to their anticipated capital costs. The goal is to:

- **Minimize capital costs**. Order-of-magnitude costs are used to evaluate the constrained rail alternatives. Capital costs include station area track and platforms, Tower 1 Interlocking, approach interlockings, signal, communication system, and overhead contact system (OCS).

As discussed earlier in the Track Configuration Alternatives section, the engineering of Constrained Alternative 2 and 3 has been advanced since the conclusion of the Tier 1 study. From a capital cost perspective, the advancements and refinements in the design are not considered an impact to the order-of-magnitude costs to any significant degree.

4.1.5 Maintenance Cost Rating

The Constrained Rail Alternatives 2 and 3 were rated according to their anticipated maintenance costs. The goal is to:

- **Minimize maintenance costs**. It was not possible at this time to determine actual maintenance costs; therefore a comparison of the quantity of maintenance expected for each of the constrained rail alternatives was utilized.

4.2 Tier 2 Alternatives Screening

4.2.1 Platform Rating

This section describes the screening results for platform rating for the station track accessibility and berthing standards criteria.

Station Track Accessibility

Table 2 and Table 3 present the proposed station track accessibility at South Station in both alternatives. The tables compare the station tracks that would be accessible for each rail service line track approaching the station in two scenarios: 1) with the crossover move(s) occurring at the approach interlocking; or 2) with the crossover move(s) occurring at Tower 1 Interlocking.

Table 2 — Proposed Station Track Accessibility, Constrained Rail Alternative 2

Trains Entering South Station			Accessible Station Tracks																			
Service Line	Track	Crossover Move at Proposed Interlocking	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Framingham/ Worcester	7	Cove	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
		Tower 1	✓	✓	✓	✓	✓	✓														
	5	Cove			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
		Tower 1			✓	✓	✓	✓														
Northeast Corridor	3	Cove			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
		Tower 1			✓	✓	✓	✓	✓	✓	✓											
	1	Cove			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
		Tower 1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
	2	Cove			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
		Tower 1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
Fairmount/ Dorchester Branch	1	Broad			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Tower 1			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
	2	Broad			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Tower 1														✓	✓	✓	✓	✓		
Old Colony	19	Broad														✓	✓	✓	✓	✓	✓	✓
		Tower 1																✓	✓	✓		
	21	Broad														✓	✓	✓	✓	✓	✓	✓
		Tower 1																✓	✓	✓	✓	✓

✓ Indicates that the station track would be accessible if the crossover move were to occur at specified interlocking.

Constrained Rail Alternative 2 Track Accessibility

- The NEC service lines and Framingham/Worcester Track 5, for crossover moves made at Cove Interlocking, would have 13 of 20 station tracks available for all trains (65% accessibility).

- The Fairmount Line/Dorchester Branch service lines track accessibility, with crossover moves at Broad Interlocking, would be high, with 18 of 20 station tracks available (90% accessibility).

- Dorchester Branch Track 2 would have limited accessibility for crossover moves at Tower 1 Interlocking with access to only five of 20 station tracks (25% accessibility).

- Station track accessibility for the Old Colony Lines would be limited, with accessibility for seven of 20 station tracks (35% accessibility) for crossover moves at Broad Interlocking. Track 19 would be most limited for crossover moves at Tower 1 Interlocking, with access to only three of 20 station tracks (15% accessibility).

Table 3 — Proposed Station Track Accessibility, Constrained Rail Alternative 3

Trains Entering South Station			Accessible Station Tracks																			
Service Line	Track	Crossover Move at Proposed Interlocking	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Framingham/ Worcester	7	Cove	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
		Tower 1	✓	✓	✓	✓																
	5	Cove	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
		Tower 1	✓	✓	✓	✓	✓	✓														
North East Corridor	3	Cove	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
		Tower 1	✓	✓	✓	✓	✓	✓														
	1	Cove	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
		Tower 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							
	2	Cove	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
		Tower 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Fairmount/ Dorchester Branch	1	Broad	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Tower 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
	2	Broad	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Tower 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Old Colony	19	Broad	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Tower 1															✓	✓	✓	✓		
	21	Broad	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Tower 1																		✓	✓	✓

✓ Indicates that the station track would be accessible if the crossover move were to occur at the specified interlocking.

Constrained Rail Alternative 3 Track Accessibility

- Trains approaching South Station via the Fairmount Line/Dorchester Branch would have nearly universal platform accessibility if the crossover move was to occur at Tower 1 Interlocking and fully universal platform accessibility for crossover moves at Broad Interlocking.

- Platform accessibility for the NEC and Framingham/Worcester service lines for crossover moves made at Cove Interlocking would be provided by 16 out of 20 station tracks (80% accessibility).

- Framingham/Worcester Track 7 would have limited track accessibility for crossover moves at Tower 1 Interlocking with access to four of 20 station tracks (20% accessibility).

- Station track accessibility for crossover moves at Tower 1 Interlocking would be most limited for the Old Colony (OC) Lines, with OC Track 21 limited to only three of 20 tracks (15% accessibility) and OC Track 19 limited to four of 20 tracks (20% accessibility).

Amtrak commented that Constrained Rail Alternative 3 is more consistent with their current dispatching than Constrained Rail Alternative 2, and expressed concerns with the differences between Constrained Rail Alternative 2 and their current dispatching. The MBTA commented that they would prefer the versatility of Constrained Rail Alternative 3.

Constrained Rail Alternative 3 receives the higher rating for this criterion because of the greater station track accessibility and stakeholder preference.

Berthing Standards

As discussed in Appendix 2 of the DEIR, the South Station terminal area presents many physical constraints to platform berthing. The SSAR project would add to these constraints by shortening some platform lengths. The platform length modifications due to SSAR are detailed in Section 3.2.4 of DEIR Appendix 2. Because of these constraints, MassDOT was required to develop design modifications to enhance platform capabilities and accommodate Amtrak and MBTA berthing length standards. These modifications are design and operational solutions that vary from standard practice; however, they have been implemented successfully in other projects with similar constraints.

The first modification is an operational solution that reduces the required platform length by locating the locomotive and a portion of the first coach beyond the end of the platform. This would restrict boarding on the first coach as it could only occur using the station end door, as shown in Figure 5. This approach would effectively increase the available berthing length of the platform by 135 feet (65 feet for locomotive and 70 feet for the first coach). As a result, the effective platform length to accommodate Amtrak trainsets would be 915 feet (as opposed to 1,050 feet), and the effective platform length to accommodate MBTA trainsets would be 715 feet (as opposed to 850 feet). In order to consider this design modification, adjustments would need to be made to the signal position and height. The signal would need to be positioned far enough away from the locomotive and at a height that can be seen by the Train Engineer, as shown in Figure 6.

The second modification is a design solution that includes using a fixed type bumping post to replace some of the longer hydraulic bumping posts which require additional space to slide along the track and are currently proposed for South Station. This solution also includes terminating OCS within the station area and using existing station structures (such as canopies, beams, columns, etc.) to support the OCS instead of using OCS tie-off poles, as shown on Figure 5. By removing the standard OCS foundation and

pole and replacing the standard movable bumping post with a fixed bumping post, this approach would effectively increase the available berthing length of the platform by 41 feet. In combination with the first design modification, the minimum effective platform length to accommodate Amtrak trainsets would be 874 feet (as opposed to 1,050 feet), and the minimum effective platform length to accommodate MBTA trainsets would be 674 feet (as opposed to 850 feet). In order to consider these design modifications, standard criteria and practices would need to be modified with a design exception and each individual exception approved by the project stakeholders.

For the purposes of this Tier 2 analysis, Constrained Rail Alternatives 2 and 3 included the use of platform boarding and alighting modifications and bumping post and OCS design modifications to accommodate Amtrak and MBTA berthing standards. Also included for this analysis was the assumption of a minimum 10-foot buffer between the end of the trainset and the face of the bumping post, as in practice today at South Station. A more thorough analysis of the space required and the space available for the platform boarding modifications will need to be conducted and MassDOT will work with project stakeholders to review potential design exceptions required to maintain acceptable platform/berthing lengths.

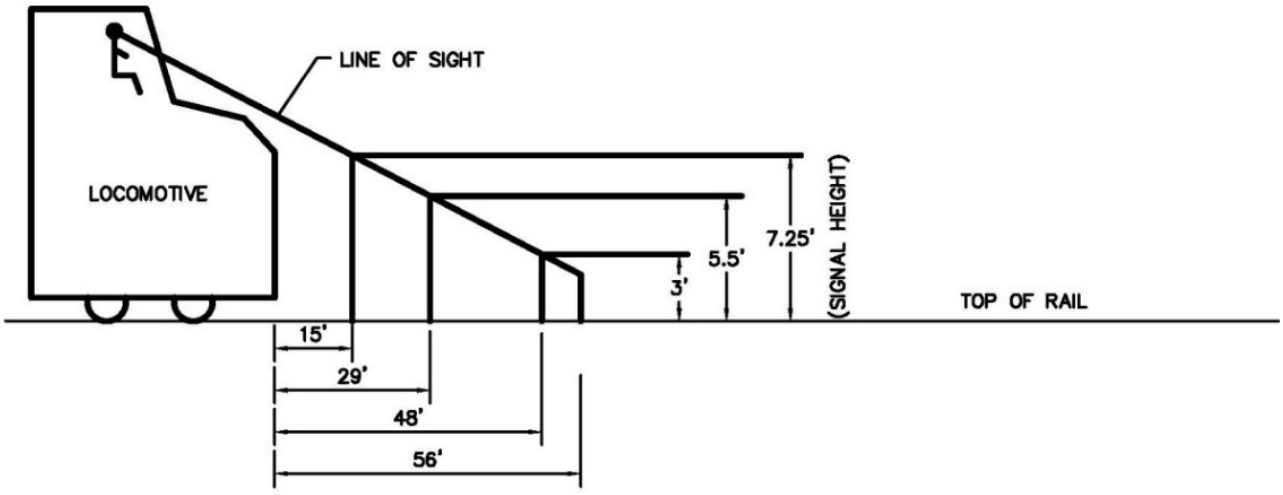

Figure 6 — Signal Sight Line

Table 4 summarizes the ability of the proposed platforms in Constrained Rail Alternatives 2 and 3 to accommodate Amtrak and MBTA berthing standards. Both Constrained Rail Alternatives 2 and 3 would meet platform berthing standards for MBTA trainsets at all station tracks, providing design modifications can be applied at all platforms. However, Constrained Rail Alternative 3 would accommodate MBTA trainsets at more station tracks than Constrained Rail Alternative 2 if platform design modifications are not permitted at some or all platforms. Constrained Rail Alternative 3 would meet platform berthing standards for Amtrak trainsets at 14 out of 20 station tracks. Constrained Rail Alternative 2 would meet platform berthing standards for Amtrak trainsets at only 10 out of 20 station tracks.

The FRA and Amtrak both commented that Constrained Rail Alternative 3 was their preferred alternative because the alternative had longer platforms. Therefore, Constrained Rail Alternative 3 receives the higher rating for this criterion.

Table 4 — Proposed Berthing Standard Accommodations, Constrained Rail Alternatives 2 and 3

Track	Platform	Alternative 2				Alternative 3			
		Design Length		With Modifications		Design Length		With Modifications	
		MBTA	Amtrak	MBTA	Amtrak	MBTA	Amtrak	MBTA	Amtrak
1	A			✓				✓	
2	B			✓				✓	
3	B			✓				✓	
4	C	✓		+	✓	✓		+	✓
5	C	✓		+	✓	✓		+	✓
6	D	✓		+	✓	✓		+	✓
7	D	✓		+	✓	✓		+	✓
8	E	✓		+	✓	✓	✓	+	+
9	E	✓	✓	+	+	✓	✓	+	+
10	F	✓	✓	+	+	✓	✓	+	+
11	F	✓		+	✓	✓		+	✓
12	G	✓		+	✓	✓		+	✓
13	H	✓		+		✓		+	✓
14	H			✓		✓		+	✓
15	I			✓		✓		+	✓
16	I			✓		✓		+	✓
17	J	✓		+	✓	✓		+	✓
18	J			✓				✓	
19	K	✓		+				✓	
20	K			✓				✓	

✓ indicates that the station platform would be able to accommodate Amtrak and/or MBTA berthing standards
\+ indicates that innovations are not necessary to accommodate Amtrak and/or MBTA berthing standards

4.2.2 Operations Rating

Operations simulation models were developed for each alternative and were evaluated for how each would support future 2035 service levels, as well as on their OTP and delay performance. Additionally, operational efficiencies and limitations of each alternative were identified.

- **Ability to Meet Future Service Goals.** Both Alternative 2 and Alternative 3 would meet the 2035 future service plans for the MBTA and Amtrak.

- **Ability to Meet OTP and delay goals.** Under randomized conditions, the average OTP was simulated to be 96% for Alternative 2 and 94% for Alternative 3 during the PM peak period, the most heavily congested portion of the day. This indicates that OTP results for a full day of operations would likely meet or exceed the OTP goal of 95% in both alternatives. Average delay in the randomized simulation was found to be 7% for Alternative 2 and 13% for Alternative 3. While the randomized results show that trains in Alternative 2 experience less delay and greater OTP than in Alternative 3, these PM peak period results indicate that both alternatives are robust and flexible enough to provide reliable service given the large increase in future 2035 trip volumes. The results prove that both alternatives can meet the goals of this project, but the minor variance between the two does not offset more significant differences in other rating criteria.

- **Operational Efficiencies/Limitations.** Operational efficiencies related to parallel moves through the Tower 1 Interlocking and access to tracks and platforms were evaluated for each alternative and are summarized below. Detailed descriptions of these operational efficiencies and limitations for each alternative are included in FEIR Appendix E, *Rail Operations Analysis Technical Report.*

The Alternative 2 layout was developed to streamline terminal operations and sectionalize the operations into "mini terminals" to reduce the amount of conflicting movements at the critical junction. Alternative 2 has significantly less special trackwork through the Tower 1 Interlocking, providing for more efficient access between the approach tracks and the platform tracks. The Alternative 2 Tower 1 Interlocking layout can support up to eight parallel train movements simultaneously between the nine approach tracks and 20 platform tracks, including five parallel movements to or from the five approach tracks from the NEC and MBTA Framingham/Worcester Line. For comparison, the existing Tower 1 Interlocking layout can currently support a total of six parallel movements, with the possibility of four parallel movements to or from the NEC and Framingham/Worcester Line approach tracks. Alternative 2 includes an operational challenge for non-revenue movements. The single connection between Dorchester Branch Track 1 to platform Tracks 3-13, forces all non-revenue operations moving between the South Side facilities and those platform tracks to use the same single piece of track into the South Station Terminal.

The Alternative 3 layout considers the addition of Tracks 14-20 by adding special trackwork to the existing Tower 1 layout in order to maximize access to platform tracks from each approach track while also maintaining as much of the existing infrastructure as possible. The Alternative 3 Tower 1 Interlocking layout can support up to seven parallel moves simultaneously between the nine approach tracks and 20 platform tracks, including four parallel movements to or from the five approach tracks from the NEC and Framingham/Worcester Line. However, if any trains from the NEC tracks are routed to a platform track higher than Track 10, the number of possible simultaneous parallel moves is reduced to six.

Alternative 3 does not provide the same level of operational efficiency or number of parallel moves as Alternative 2; but it does provide increased flexibility for non-revenue moves between the station platform tracks and the south side layover facilities with two ladders to access the Dorchester Branch tracks. This second Fairmount Line/Dorchester Branch ladder track provides less of an opportunity for delays if a disabled train or other unexpected activity blocked trackwork within the Tower 1 Interlocking. The significant amount of special trackwork throughout the Alternative 3 Tower 1 Interlocking layout may pose challenges for operations in the terminal.

Both Amtrak and the MBTA commented that the lack of a second ladder connection for the Fairmount Line/Dorchester Branch in Constrained Rail Alternative 2 was a significant concern and differs from what occurs today at South Station. It was stated that Constrained Rail Alternative 3 would be preferred as it provide the second ladder connection within the terminal area. During stakeholder meetings, Amtrak and the MBTA both reflected on recent events where the second ladder connection was necessary for access to the terminal. Amtrak also commented that Constrained Rail Alternative 3 looked more favorable because of the operational benefits. Constrained Rail Alternative 3 is therefore rated higher for this criterion.

4.2.3 Constructability Rating

Constrained Rail Alternative 2 would require a complete reconfiguration of the existing Tower 1 Interlocking and would require a new operations plan to be implemented by the dispatcher, while retaining existing station Track 1-13 alignments and platform widths. Several switches and crossovers would be removed from the Tower 1 Interlocking, requiring reconfiguration of the existing tracks within the interlocking. This complete reconfiguration of the existing interlocking is challenging to constructability because it will require significant disruptions to current service to the terminal during construction.

Constrained Rail Alternative 3 would maintain the existing configuration of Tower 1 Interlocking with modifications and replacements to a much lesser degree than Constrained Rail Alternative 2. It would not require the extensive special trackwork and realignment required in Constrained Rail Alternative 2. The additional track expansion would tie into the eastern side of Tower 1 Interlocking, limiting the required track outages and impacts to rail service, especially for the tracks entering the terminal from the west. Additional special trackwork within Tower 1 Interlocking would limit required track outages because it is anticipated that the work would not require much of the interlocking to be taken out of service at the same time or for an extended period of time. However, the additional special trackwork required within Tower 1 Interlocking could pose challenges to constructability because of the complexity of the special trackwork required to fit within the existing tracks and special trackwork.

The FRA, Amtrak, and MBTA were all presented with the Constrained Rail Alternative 2 and 3 constructability analysis and asked for comments and preference. All parties agreed that constructability is a major issue and that Constrained Rail Alternative 3 is the preferred alternative because it can be built up to a certain point without impacting operations whereas Constrained Rail Alternative 2 would require the complete replacement of Tower 1 Interlocking, which represents a significant additional risk to construction phasing and operations.

Since it is anticipated to require the least amount of track outages and is the preferred alternative amongst the stakeholders, Constrained Rail Alternative 3 receives the higher rating for this criterion.

4.2.4 Order-of-Magnitude Capital Cost Rating

Table 5 presents order-of-magnitude capital costs for constructing the Constrained Rail Alternatives 2 and 3. Capital costs were calculated for all tracks, signal system, OCS, communication system, and associated civil work within terminal and station areas including work at Tower 1, and the approach interlockings. These cost estimates were based on the initial conceptual designs and are used as to compare Constrained Rail Alternatives 2 and 3. The capital costs here do not represent present project costs.

The FRA, Amtrak, and MBTA were all presented with Constrained Rail Alternatives 2 and 3 and asked for comments and preference. All identified Constrained Rail Alternative 3 as the preferred alternative because it is the less expensive option.

Constrained Rail Alternative 3 receives the higher rating for this criterion.

Table 5 — Capital Costs, Constrained Rail Alternatives 2 and 3

Alternative	Order-of-Magnitude Capital Costs
2	$175 million
3	$111 million

4.2.5 Maintenance Cost Rating

Although specific costs associated with maintenance have not been calculated, the quantity of maintenance for the two alternatives can be compared. It is anticipated that Constrained Rail Alternative 3 would require the highest overall maintenance requirements because it would require a greater amount of special trackwork at Tower 1 Interlocking. Constrained Rail Alternative 2 would require a lesser amount of special trackwork at Tower 1 Interlocking and is therefore anticipated to require the least amount of overall maintenance and lower maintenance costs. Table 6 presents a comparison of the amount of special trackwork at Tower 1 Interlocking for the existing conditions, Constrained Rail

Alternative 2, and Constrained Rail Alternative 3. Constrained Rail Alternative 2 receives the higher rating for this criterion.

Table 6 — Amount of Special Trackwork, Existing and Constrained Rail Alternatives 2 and 3

Alternative	Turnouts	Double Split Switches	Diamond Crossings
Existing	24	13	2
2	15	7	0
3	21	13	4

4.2.6 Summary of Findings

Table 7 summarizes the findings of the Tier 2 screening of Constrained Rail Alternatives 2 and 3. Constrained Alternative 3 ranked higher in four of the performance criteria:

- Platform accessibility;
- Platform berthing lengths;
- Constructability; and
- Capital cost.

In addition, all project stakeholders were in agreement that Constrained Rail Alternative 3 is their preferred alternative. Based on this and the results of all rating criteria, Constrained Rail Alternative 3 is recommended as the alternative that will advance to preliminary design.

Table 7 — Summary Tier 2 Screening Table, Constrained Rail Alternatives 2 and 3

Alternative	Platform Rating		Operations Rating	Constructability Rating	Capital Cost Rating	Maintenance Cost Rating	Stakeholder Preference
	Accessibility	Berthing					
2	2	2	1	2	2	1	2
3	1	1	2	1	1	2	1

Note: A rating of 1 indicates the more favorable alternative in comparison to the other alternative for the specific criterion. A rating of 2 indicates the less favorable alternative in comparison to the other alternative for the specific criterion.

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SOUTH STATION
EXPANSION

Appendix E - Rail Operations Analysis Technical Report

June 2016

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Massachusetts Department of Transportation

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1. Introduction

The purpose of this technical report is to summarize the basis of the operations analysis for the South Station Expansion (SSX) project. This includes the methodology and assumptions used in the railroad simulation modeling effort, and the results of the operational evaluation of two potential South Station Terminal configurations. This report follows up on the October 2014 South Station Expansion Project Draft Environmental Impact Report (DEIR) Appendix 2 – *Track Configuration Alternatives Analysis - Tier 1 Screening Technical Report.*

The main findings from the rail operations analysis are as follows:

- Alternative 2 provides seven additional platform tracks and reconfigures Tower 1 Interlocking in its entirety. This alternative maximizes the number of parallel moves through the terminal to increase operational efficiency to the greatest extent possible, and reduces special trackwork in Tower 1 Interlocking. However, it limits the connection between certain platform tracks and the South Side layover facilities.

- Alternative 3 provides seven additional platform tracks and minimizes the amount of new trackwork by connecting to the existing South Station track configuration to the greatest extent possible. Special trackwork added to the existing Tower 1 Interlocking would maximize access to platform tracks from each approach track. Alternative 3 would provide increased flexibility for non-revenue moves between the station platform tracks and the South Side layover facilities. However, it limits access between certain platform tracks and the NEC.

2. Background

The existing South Station Terminal is currently constrained and operating at capacity during the morning and evening peak periods. The configuration of the existing platforms and track infrastructure limits South Station's capacity.

The most critical piece of South Station's track infrastructure is the Tower 1 Interlocking, a major series of signals and switches located immediately outside of the South Station platforms. Tower 1 Interlocking controls train movements between the South Station platforms and the main line tracks of two major rail corridors – one approaching South Station from the south and one from the west. There are nine main line approach tracks, which currently converge through Tower 1 Interlocking and then expand into 13 station tracks and eight platforms in the South Station Terminal area. Of these nine main line tracks, five mainline tracks arrive at South Station from the west, consisting of the NEC Main Line, which operates on Tracks 1, 2, and 3, and the Framingham/Worcester Line, which operates on Tracks 5 and 7. The remaining four main line tracks arrive at South Station from the south, and consist of the Fairmount Line/Dorchester Branch, which operates on Fairmount Line/Dorchester Branch Tracks DB1 and DB2 and the Old Colony Line, which operates on Tracks OC1 and OC2. These four tracks also access the Amtrak and MBTA train maintenance facilities and layover yards.

The existing Tower 1 Interlocking allows a train approaching South Station, on any track, to reach nearly every platform track, effectively limiting the number of trains that can simultaneously move through the interlocking. As shown in the graphic, limiting the number of platforms each train can access increases the parallel moves through the terminal interlocking. In addition, the infrastructure layout forces diverging moves to be made at reduced speeds (10 miles per hour [mph]) in the Tower 1 Interlocking. Cove and Broad Interlockings do not have the capability to allow for the diverging moves needed for efficient operations in and out of the terminal area, forcing many diverging moves to be made at Tower 1

Interlocking (at 10 mph vs. 30 mph at Cove Interlocking), creating more conflicts and resulting in additional delays.

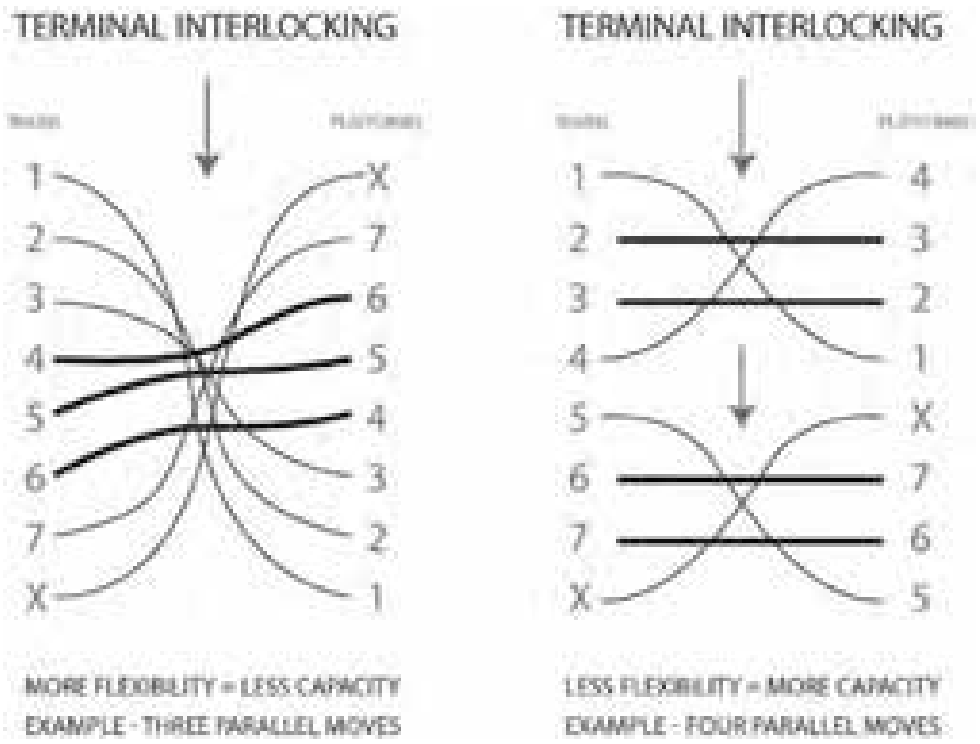

Figure 1 — Capacity versus Operations Example

In addition to the capacity constraints of the Tower 1 Interlocking infrastructure, the lack of adequate layover facilities to the west of South Station creates serious conflicts within the terminal area. Currently, non-revenue yard movements from the stations' lower tracks must cross over to the Dorchester Branch tracks that provide layover access to the Southampton Street Facilities (Front Yard and MBTA's South Side Service and Inspection facility) and Readville (Yard 2). These non-revenue movements restrict access to most of the South Station platforms, obstructing operations on the high-speed NEC into the terminal. As Amtrak and MBTA service volumes increase, these conflicts will be magnified, making it difficult to provide reliable operations. Additional revenue trains associated with the expanded operations will need to compete for limited capacity and terminal track space, which will be further exacerbated by non-revenue trains moving between the terminal and yards.

During the earlier stages of project development, MassDOT identified and evaluated a first set of rail infrastructure alternatives for consideration at the SSX project site. These concepts were developed and evaluated as a part of a first level, or Tier 1, analysis, which are detailed in the October 2014 South Station Expansion Project Draft Environmental Impact Report (DEIR) Appendix 2 – *Track Configuration Alternatives Analysis - Tier 1 Screening Technical Report.*

Based upon evaluation of the various alternatives for platform berthing, infrastructure maintenance, constructability, and order-of-magnitude capital costs, MassDOT determined that Constrained Rail Alternatives 2 and 3 should be advanced into a Tier 2 analysis. To support this effort, operations simulation modeling was conducted for Constrained Rail Alternatives 2 and 3. This work was done to support a portion of the analysis described in FEIR Appendix D - *Track Configuration Alternatives Analysis - Tier 2 Screening Technical Report* and evaluated each alternatives ability to meet future South

Station operational needs, which included measuring the ability to accommodate future service plans and meet on-time performance (OTP) and delay goals, as follows:

- **Accommodate future service plans**. By the year 2035, Amtrak projects 80 weekday revenue trips and 58 weekday non-revenue trips, representing a 100% revenue service increase above current levels. By 2035, the MBTA projects up to 315 weekday revenue trips and 101 weekday non-revenue trips, representing a 13% revenue service increase above current levels. Projections of train movements in and out of South Station are estimated to be a total of 554 daily trains by the year 2035, representing an overall increase of 23% above current revenue service levels.[1]
- **Meet OTP and delay goals**. OTP and delay goals have been established for the South Station complex, which includes the South Station platforms, Tower 1 Interlocking, and the key approach interlockings at Cove on the NEC and Broad in the Southampton Street area. OTP goals for the South Station area are consistent with the current service delivery policy goals of 95% OTP for MBTA[2] commuter rail trains and 95% OTP for Amtrak Acela and Northeast Regional services.[3] The delay percentage represents the percentage of time the trains are operating at less than their maximum or optimal operating speed, and demonstrates the amount of flexibility the given infrastructure has to support the simulated operations. Delay goals are generally to minimize the percentage by which trains are delayed. Delay percentage is a useful statistic to compare infrastructure alternatives and judge their overall operational stability, as it shows the amount of flexibility the infrastructure alternatives have to support a given operating plan.

The following sections provide a detailed discussion of the proposed operations analysis effort, including the methodology and assumptions incorporated into the proposed operations simulation models and future 2035 operating plans. This technical report also summarizes the results of the operational analysis of Alternative 2 and Alternative 3.

3. Methodology

The proposed South Station Terminal track layouts were developed with the goal of increasing the capacity of South Station to meet future operational needs. This is accomplished not only by increasing the number of platform tracks at South Station from 13 to 20 tracks, but by also making improvements to the layouts of Tower 1 and Broad Interlockings to allow for more efficient operations for trains moving in and out of the South Station terminal. Both alternatives were then evaluated by their ability to meet the 2035 South Station operational needs, as measured by their ability to accommodate future service plans and to meet OTP goals, as further described below.

Berkeley's Rail Traffic Controller® (RTC) simulation software was used for the operations analysis of the SSX project. RTC is used to simulate the movement of trains through complex rail networks, such as the South Station terminal area and the Northeast Corridor (NEC). It can be used for a variety of purposes including simulations for operational studies and analyses and simulating real-time train operations. The RTC software simulates trains operating under "deterministic" or "randomized" conditions. Simulating under *deterministic* operations, all train equipment initially enters service on-time and follows fixed departure times and dwell times at stations according to the schedules. Simulating under *randomized*

[1] 2035 revenue service level weekday train movements are based on Massachusetts Department of Transportation. *Basis of Operations Analysis and Assumptions Verification Report*, Version 4. November 2014.

[2] According to the MBTA *Service Delivery Policy* (June 2, 2010), a train is considered on time if it is arriving or departing at a terminal station within 5 minutes of scheduled arrival and departure times. The MBTA Commuter Rail Schedule Adherence Standard for OTP is 95%.

[3] Amtrak Intercity Passenger Rail On-Time Performance: Twentieth Quarterly Report to Congress, February 2013. Viewed June 12, 2013 at www.fra.dot.gov.

conditions allows for the introduction of randomized delays to the simulation in order to observe the effects on the operations. This is important in order to determine the overall stability of an operation. Random delays happen in real day-to-day operations due to signal or track maintenance, malfunctioning equipment or disabled trains, or conflicts with other operations.

The RTC software was used to simulate future South Station rail operations of the two alternatives. To determine whether the infrastructure could support future operations, the heaviest operational period was selected for this analysis: the weekday PM peak period (4:00 PM to 7:30 PM). Existing conditions indicate that this period is the heaviest and most congested period of terminal operations given the large number of revenue and non-revenue Amtrak and MBTA trains.

4. Assumptions

In an effort to accurately reflect actual railroad operations in the model, the following assumptions were used in the operations analysis simulation models. The following list of assumptions was developed in consultation with project stakeholders and railroad operations staff:

- Model Limits
    - NEC Amtrak / MBTA Providence Line – Mansfield
    - MBTA Framingham/Worcester Line – CP-4/Beacon Park Yard
    - MBTA Needham Line – Forest Hills Station
    - MBTA Franklin Line – Readville Station
    - MBTA Fairmount Line – Readville Station
    - MBTA Old Colony Line – JFK Station
    - MBTA South Coast Rail – Future – Canton Junction
    - The analysis does not consider the impacts of proposed future operations beyond the limits of the South Station terminal area.
- Peak Period
    - Weekday afternoon/evening period (4:00 PM to 7:30 PM)
- Operations
    - All Amtrak and MBTA revenue and non-revenue train movements between the South Station terminal, existing layover facilities at Southampton Street and Readville-Yard 2, and assumes proposed layover facilities at Widett Circle and Beacon Park Yard.
    - 2035 Amtrak, MBTA and New England Regional (Inland) operating plans/service levels as provided by or developed with input from stakeholders. (See the following section for additional information on future operating plans.)
- Dwell Times
    - MBTA low-level platform stations: 120 seconds peak, and 45 seconds off-peak at Mansfield, Sharon, Route 128 and Back Bay (Tracks 5 and 7) Stations.
    - MBTA high-level platforms station: 60 seconds peak, and 30 seconds off-peak station dwells.
    - Amtrak stations: 120 seconds peak, and 60 second off-peak and reverse direction peak period dwells.

- Turn Times
    - MBTA turn times are scheduled for 15 minutes, where possible, but will allow for no less than 10 minutes per the MBTA standard operating minimum.
    - All Amtrak Acela and Regional trains return to Southampton Street Facilities between revenue moves, with the exception of four mid-day Acela train turns specified below, for which the trains remain on the platform to turn between the revenue moves:
        - 2190-2165
        - 2150-2167
        - 2154-2173
        - 2158-2175
- Rolling Stock
    - All diesel MBTA trainsets have one F40PH-2C locomotive pulling eight coaches. The future South Coast Rail service to New Bedford and Fall River will have one HHP-8 electric locomotive to pull eight coaches.
    - The 2035 Amtrak Acela trainsets will have two AECP locomotives and eight Acela coaches. The 2035 Amtrak Regional trains will use one HHP-8 electric locomotive to pull ten coaches. The 2035 Amtrak Regional Inland trains will use one F40PH-2C diesel locomotive to pull eight coaches. Amtrak Lake Shore Limited trains will use two F40PH-2C diesel locomotives to pull six coaches.
    - The Future Inland New England Regional trains will use one F40PH-2C diesel locomotive to pull three coaches.

5. Future 2035 Operating Plans

The future simulation models include all planned 2035 MBTA and 2035 Amtrak operations within the study area limits as described below. These service plan assumptions were developed with or provided by MBTA and Amtrak stakeholders as inputs for this operations' analysis.

5.1. Future 2035 MBTA Operations

By 2035, the MBTA's proposed plan will provide 315 weekday revenue trips and 101 weekday non-revenue trips in South Station. For the 2035 MBTA commuter rail service, it was assumed that, with the exception of the Old Colony Lines, each MBTA commuter rail line would gain one additional peak period/peak direction trip. As determined in the *MassDOT Boston South Station HSIPR Expansion Project, Technical Memorandum: Network Simulation Analysis of Proposed 2030 MBTA/Amtrak Operations at South Station Final Report, dated August 1, 2010,* due to capacity constraints, the Old Colony Main Line cannot accommodate additional service without infrastructure improvements.

With the exception of the Fairmount Line, the MBTA Commuter Rail schedules and South Side equipment cycle, effective April 29, 2013, were used as the starting point for these operational inputs. On the Fairmount Line, it was assumed that the four new or planned stations (Newmarket, Four Corners, Talbot Avenue, and Blue Hill Avenue) will be in service by 2035 and that all Fairmount Line trains will stop at all of the existing and new stations. The Fairmount Line service for the future simulation models

is based on service levels specified by CTPS.[4] The 2035 Fairmount Line service, included in the simulation models, will operate with 25-minute headways in the peak periods and at an average of 40-minute headways midday and at nighttime.

The future simulation models also include the proposed 2030 South Coast Rail service to New Bedford and Fall River. This service is based on the proposed South Coast Rail Stoughton Electric Alternative taken from the *Draft Technical Report: Operations Analysis of the Stoughton Electric Alternative*.[5]

These service plan assumptions and service levels for future 2035 MBTA commuter rail service were developed into a future 2035 MBTA South Side operating plan, including full day future schedules for each service and a future South Side equipment cycle. The future full day 2035 MBTA schedules and equipment cycle are attached in Attachments A and B.

5.2. Future 2035 Amtrak Operations

By the year 2035, Amtrak projects 80 weekday revenue trips and 58 weekday non-revenue trips. Future 2035 Amtrak operations are based on the Northeast Corridor Intercity Service Alternative: "B-Low 2020-2040" operating plan provided by Amtrak.[6] The assumed 2035 Amtrak operations will include 14 Acela and nine Regional trains on the NEC in both the northbound and southbound directions. The service plan also includes four projected Inland Regional round trips, and one Inland Lake Shore Limited round trip. It is worthwhile to note that the FRA is currently analyzing the potential future growth along the NEC between Washington, DC and Boston as part of the NEC Future Project, which analyzes alternatives proposing to significantly increase railroad operations along the entire NEC.

The future 2035 operations also includes a proposed Inland New England Regional InterCity service to Springfield. This future service is also based on the Northeast Corridor Intercity Service Alternative: "B-Low 2020-2040" operating plan provided by Amtrak, and includes 12 round trips. The future full day 2035 Amtrak and New England Regional schedule are attached in Attachment B. The future 2035 full day South Station platform Track Occupancy Chart is also attached in Attachment D.

5.3. Future Freight Operations

Future freight operations were assumed to operate as they do today within the project study area. For the purposes of the simulation, existing freight windows were preserved so that no existing freight routes would be adversely impacted.

[4] *Description of Modeling Assumptions and Analysis Methodology for the State Implementation Plan Transit Commitment Projects Current and Proposed Substitutions.* Executive Office of Transportation. March 13, 2007.

[5] *Draft Technical Report, Operations Simulation, Stoughton Electric Alternative.* MassDOT, July 2012.

[6] Northeast Corridor Intercity Service Alternative: "B-Low 2020 – 2040" operating plan provided by Amtrak on November 11, 2013.

5.4. Future Midday Layover Operations

In addition to all revenue train moves, the simulation models also include all MBTA and Amtrak non-revenue train movements between South Station and the layover facilities.

Under existing conditions at South Station, given the configuration of the Tower 1 Interlocking, MBTA trains must cross several main line tracks to access the existing midday layover facilities on the south side of the terminal. When these trains cross through Tower 1, other trains are temporarily restricted from entering or exiting Tower 1 until those trains have cleared. Valuable main line capacity and capacity at South Station are expended by these conflicting train movements.

Having MBTA layover facilities to the west and to the south, along both major rail corridors accessing South Station, would make railroad operations at South Station more efficient and would better accommodate future service growth.

All Amtrak trains enter the South Station Terminal from the west and lay over at existing Southampton Street Yard on the south and will continue to do so in the future. As such, locating MBTA layover facilities to the west and the south would provide many benefits, including: allow Amtrak trains near exclusive use of the central platforms at South Station; allow for a greater number of trains to move in and out of the terminal; and reduce conflicting movements at Tower 1 that consume critical railroad operational capacity. To optimize South Station operations, MBTA revenue trains entering South Station from the south ideally would layover on the south. Likewise, MBTA revenue trains entering from the west ideally would lay over on the west. While there will always be a need for some trains to cross over between the south and west at Tower 1, providing two MBTA separate midday layover facilities would considerably increase South Station's capacity and efficiency of operations.

For the purpose of the 2035 operations analysis, future MBTA proposed midday layover facilities were assumed at Widett Circle and Beacon Park Yard in addition to the existing facilities at the MBTA's South Side Servicing and Inspection (S&I) and Readville - Yard 2 facilities. The proposed future 2035 MBTA equipment cycle developed for the purposes of this operations analysis identified the MBTA equipment trainsets assigned to each midday layover facility. The MBTA equipment would be rotated as necessary on two or three day cycles, as is done today, to balance equipment usage and meet maintenance requirements.

6. Future Infrastructure

During the earlier stages of project development, MassDOT identified and evaluated a first set of rail infrastructure alternatives for consideration at the SSX project site. These concepts were developed and evaluated as a part of a first level, or Tier 1, analysis, which are detailed in the October 2014 South Station Expansion Project Draft Environmental Impact Report (DEIR) Appendix 2 – *Track Configuration Alternatives Analysis - Tier 1 Screening Technical Report.* From this analysis, Alternatives 2 and 3 were identified to be advanced further into a Tier 2 analysis, for which an operations analysis would be performed.

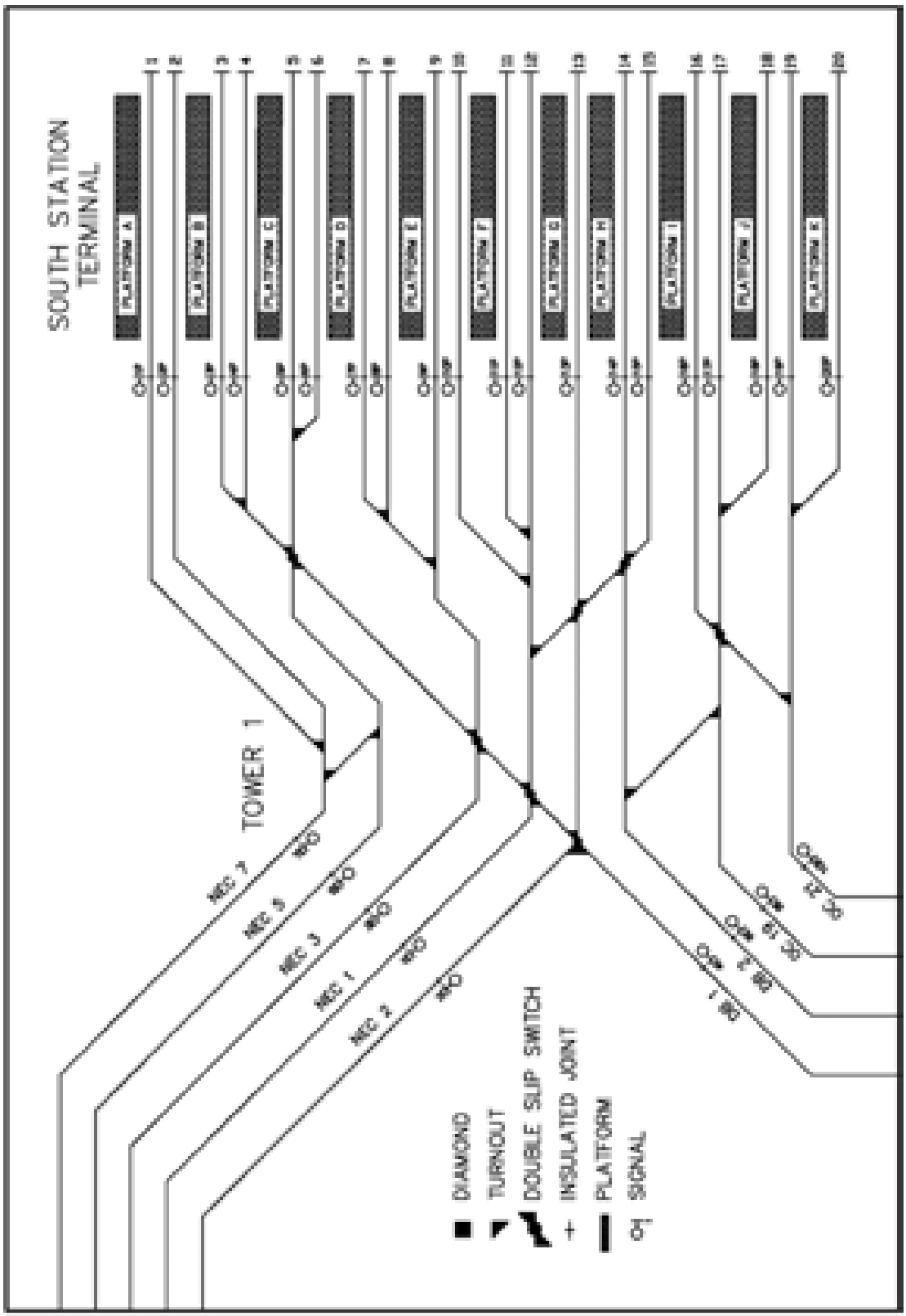

Figure 2 — Alternative 2

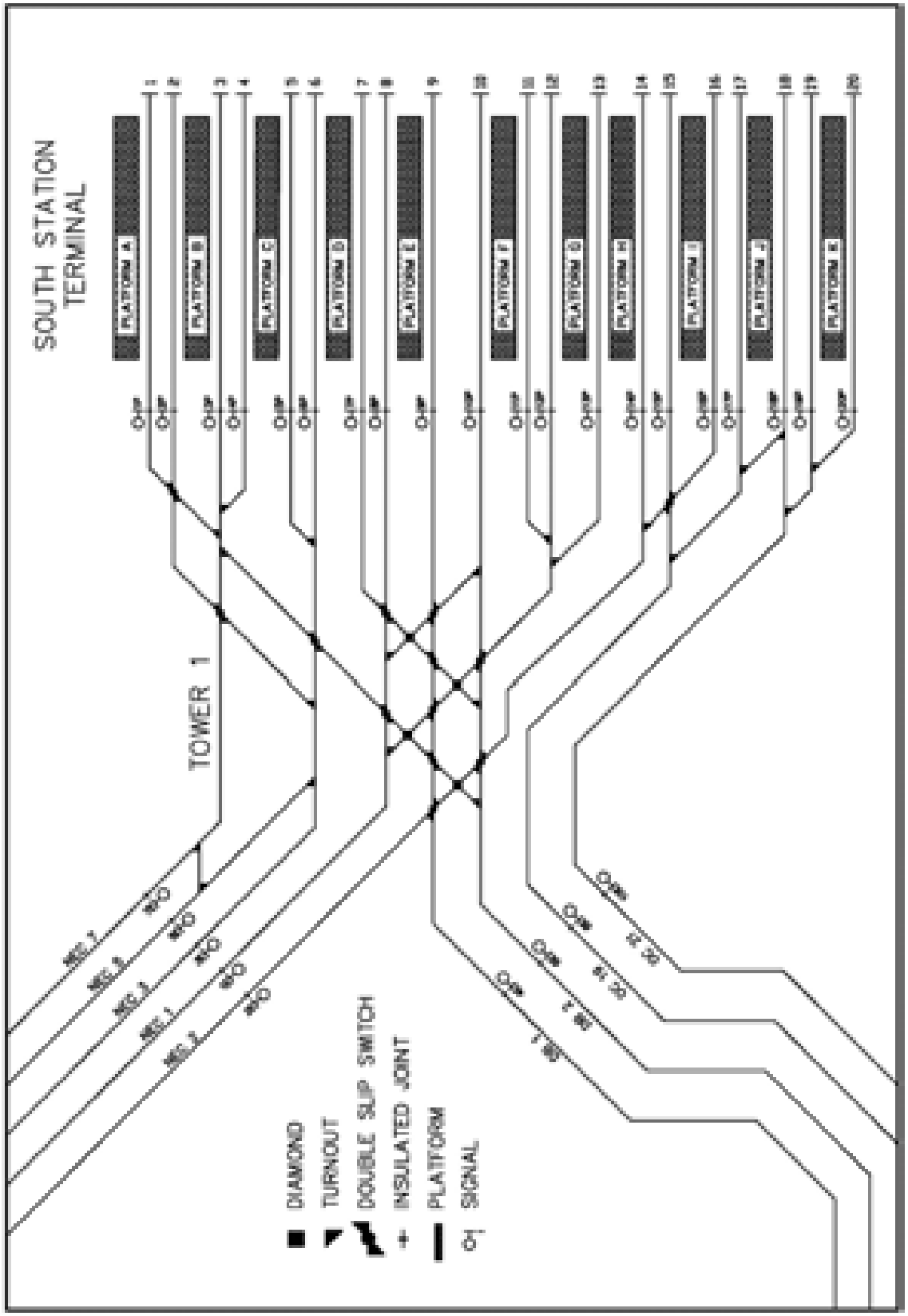

Figure 3 — Alternative 3

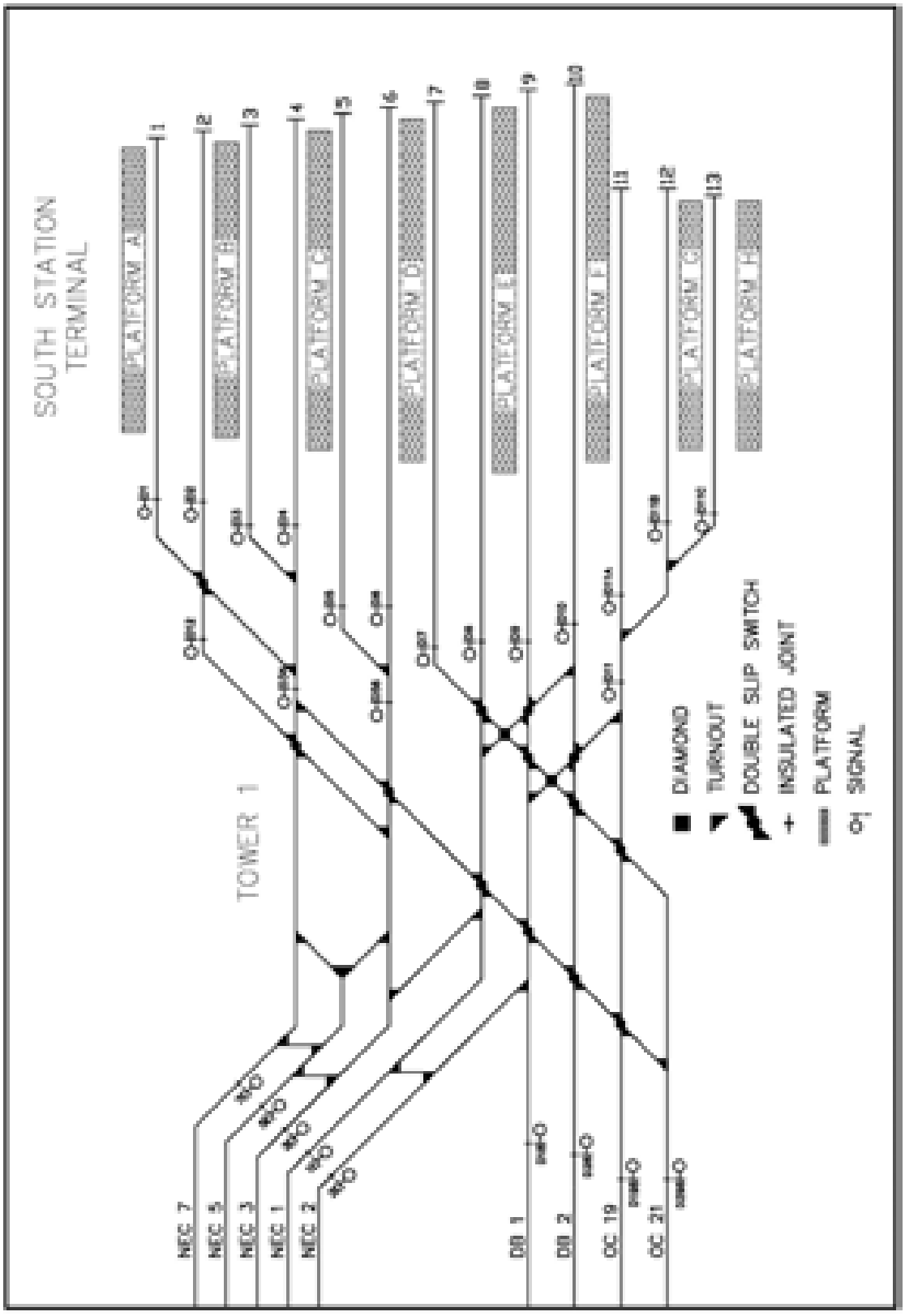

Figure 4 — Existing Conditions

The infrastructure for Alternatives 2 and 3 was developed to support operational efficiencies within the South Station Terminal area, including the ability to provide multiple parallel moves through the Tower 1 Interlocking, and to better access platform berths. The following describes some of the operational benefits of the track configurations developed for Alternatives 2 and 3:

- **Parallel Moves through Tower 1 Interlocking**: The existing South Station layout can support up to six parallel moves through Tower 1 Interlocking. The proposed layout of Tower 1 Interlocking in Alternatives 2 and 3 can support up to eight and seven trains simultaneously moving through the Tower 1 area, respectively.

- **Efficiencies for Platform Berthing:** The proposed alternatives encourage the use of "setup interlockings" at Cove and Broad interlockings to make faster and more efficient crossover moves and to better prepare trains for access to berth at the platforms, while still providing operational flexibility in the event of failures. By using the setup interlockings at Cove and Broad interlockings for crossover movements, South Station could be dissected into "mini terminals" with dedicated platform areas for south and west side services. Because the Tower 1 Interlocking has speed limitations of less than 10 mph, the use of the higher speed (> 30 mph) Cove and Broad interlockings for crossovers would make the necessary crossing movements more efficient, allow for faster movement, and significantly reduce conflicting movements in Tower 1.

Toward these goals, simulation models were developed for each Alternative to test its ability to support the future South Station operations. The following sections summarize each of the infrastructure alternatives simulated, and their operational advantages and disadvantages.

6.1. Alternative 2

The Alternative 2 Tower 1 Interlocking layout is a reconfiguration of the Tower 1 Interlocking connecting the proposed 20 platform tracks with the Northeast Corridor (NEC), the Fairmount Line/Dorchester Branch, and the Old Colony Branch (see Figure 1). The Alternative 2 layout would streamline terminal operations and sectionalize the operations into "mini terminals" to reduce the number of conflicting movements at the critical junction. The Alternative 2 Tower 1 Interlocking layout would support up to eight parallel train movements simultaneously between the nine approach tracks and 20 platform tracks, including five parallel movements to or from the five approach tracks from the NEC and MBTA Worcester Line. For comparison, the existing Tower 1 Interlocking layout can currently support a total of six parallel movements, with the possibility of four parallel movements to or from the NEC and Worcester Line approach tracks.

Alternative 2 makes extensive use of the setup interlockings, such as Cove Interlocking, to allow trains to approach South Station on the appropriate track leads and to quickly move into the desired platform locations while crossing over as few other approach tracks within Tower 1 Interlocking as possible. This operating philosophy would reduce the number of conflicting movements required in the terminal Tower 1 Interlocking, and allow for increased capacity through the terminal area.

In the Alternative 2 layout, a train approaching Tower 1 from NEC Tracks 1-3 would be able to reach only platform Tracks 3-15. Platform Tracks 1 and 2 would not be accessed from these approach tracks, as a result of the lengthening of the platforms and the loss of the connection to these tracks in Alternative 2. Alternative 3 maintains the existing platform length for platform Tracks 1 and 2 and, as such, trains approaching from NEC Tracks 1-3 would be able to access platform Tracks 1-15. The Old Colony and Fairmount Lines would primarily be berthed on Tracks 16-20.

In Alternative 2, there would be operational challenges for non-revenue moves between platform Tracks 3-13 and the South Side layover facilities along the Fairmount Line/Dorchester Branch. In this configuration, platform Tracks 3-13 would only be accessible via Dorchester Branch Track 1 approaching Tower 1 interlocking from the south. In the PM period, non-revenue service coming from the South Side layover facilities would all be routed over this single route of access to reach these platform tracks to prepare for revenue service. These non-revenue moves would be scheduled sequentially and take advantage of gaps between arriving and departing revenue service in Tower 1 in order to reach the appropriate platform track without conflicting with revenue operations and causing delay. As evident in the randomized simulations and described in more detail in the following sections, the Alternative 2 layout and the future operating plan would be robust enough to handle these non-revenue moves with limited delay to revenue service and without significantly impacting on time performance.

6.2. Alternative 3

The Alternative 3 Tower 1 Interlocking layout considers the addition of Tracks 14-20 while maintaining as much of the existing infrastructure as possible (see Figure 2). In this layout, most of the existing special trackwork would remain.[7] Due to the remaining existing infrastructure within Tower 1, arriving and departing trains (specifically those accessing Tracks 7-16 from the NEC) would be forced to make slower single access point maneuvers through the Tower 1 Interlocking, reducing the ability for simultaneous parallel moves.

The Alternative 3 Tower 1 Interlocking layout could support up to seven parallel moves simultaneously between the nine approach tracks and 20 platform tracks, including four parallel movements to or from the five approach tracks from the NEC and Worcester Line. However, if any trains from the NEC tracks were routed to a platform track higher than Track 10, the number of possible simultaneous parallel moves would be reduced to six.

In Alternative 3, a train approaching Tower 1 from NEC Tracks 1 or 2 would be able to reach platform Tracks 1-14 to berth. As in Alternative 2, ideally any crossover moves would be made more efficiently at higher speeds in Cove Interlocking to allow the train to approach South Station on the appropriate track lead and to quickly move into the desired platform location. However, the remaining existing special trackwork in Alternative 3 duplicates many of these crossover moves in Tower 1, forcing moves to be made at slower speeds while crossing over other approach routes through the interlocking.

Alternative 3 was designed to provide the additional seven platform tracks and connect them to the existing South Station layout by adding special trackwork to the existing Tower 1 layout in order to maximize the access to platform tracks from each approach track. When compared to Alternative 2, Alternative 3 would not provide the same operational efficiency or number of parallel moves. However, because it would provide two ladder tracks from the Fairmount Line/Dorchester Branch, Alternative 3 would provide greater flexibility for non-revenue moves between the platform tracks and the South Side layover facilities.

The significant amount of special trackwork throughout the Tower 1 Interlocking layout would pose several challenges for operations in the terminal as described below.

Alternative 3 would allow trains approaching the station from the NEC to access platform Tracks 1-16 from NEC Track 2. However, outbound revenue trains departing from South Station platforms

[7] Special trackwork is a collective railroad term for all components and accessories of turnouts and crossovers or similar track features, including switches, double slip switches, and diamonds.

Tracks 14-16 that must access the NEC could only reach NEC Track 2, which is primarily Amtrak's inbound track. These trains must be routed via NEC Track 2 between Tower 1 and Cove Interlockings, where they could then switch tracks to the primarily outbound NEC Track 1. This operational challenge makes berthing trains on platform Tracks 14-16 less desirable when the trains are turning for outbound NEC revenue service, unless there is no other alternative. If it is necessary to berth trains on these platforms that are turning for outbound NEC service, the operating plan must allow for the outbound move via NEC Track 2 in between any inbound service from the NEC or route the inbound service to avoid creating conflicts and delay on NEC Track 2.

A second operational challenge posed by Alternative 3 concerns the access between NEC Track 3 and the South Station platform tracks. In Alternative 3, only four parallel moves would be possible between the station platform tracks and the five approach tracks from the west (the three NEC tracks and the two Worcester Line tracks). Due to the amount of special trackwork added to the Tower 1 Interlocking, it is not possible to connect NEC Track 3 to the terminal as its own approach track into the station. As a result, NEC Track 3 and NEC Track 5 combine as one approach in Tower 1 Interlocking, and trains approaching South Station on those tracks could only access platform Tracks 1-6. Corridor trains needing to access higher platform tracks must approach the terminal from NEC Tracks 1 or 2, limiting the number of parallel moves that can be made simultaneously. This is compared to Alternative 2, where NEC Track 3 would have a separate approach from NEC Track 5 into the terminal and can access platform Tracks 7-9, allowing for an additional parallel move between the station platform tracks and the NEC.

A third operational challenge posed by the Alternative 3 layout would be track access to platform Tracks 16-20 for Fairmount Line and Old Colony Line service. The primary platform tracks for berthing Fairmount Line trains would be Tracks 16 and 17, and Old Colony Line trains would primarily berth on Tracks 18-20. In Alternative 3, platform Track 17 could only be accessed from Old Colony Track 19, forcing Fairmount service to approach from that track and creating the potential for conflicts with Old Colony Line service. Platform Track 16 could be accessed from both Fairmount Line/Dorchester Branch Tracks 1 and 2 and Old Colony Track 19. This provides flexibility for routing Fairmount Line service as the trains can be routed directly to or from the Dorchester Branch tracks. However, a Fairmount Line train arriving or departing platform Track 16 to Dorchester Branch Track 2 would prevent a parallel move to or from platform Tracks 14 or 15. Similarly, a Fairmount Line train arriving or departing platform Track 16 to Dorchester Branch Track 1 would prevent a parallel move to or from platform Tracks 14 or 15, as well as conflict with any train moving between any platform track and the Dorchester Branch tracks or NEC Track 2. In comparison, Alternative 2 would provide more flexible track access for Fairmount Line and Old Colony Line trains. Trains could move between platform Tracks 16-18 and Fairmount Line/Dorchester Branch Track 2, Old Colony Track 19 and Old Colony Track 20 without conflicting with train movements to or from platform tracks lower than Track 16. With future increased Fairmount Line service frequencies, these challenges for the Alternative 3 layout would increase conflicts and delay for Fairmount Line and Old Colony Line services.

7. Operations Analysis Results

The future 2035 South Station Tower 1 Interlocking layouts, Alternative 2 and Alternative 3, were simulated using Berkeley's RTC simulation software. To determine whether the infrastructure of each alternative could support the future operations, the heaviest operational period was selected for this analysis: the weekday PM peak period (4:00 PM to 7:30 PM). Existing conditions indicate this as the heaviest and most congested period of terminal operations given the large number of revenue and non-revenue Amtrak and MBTA trains. Future 2035 MBTA and Amtrak schedules indicating which trains were included in the simulation models are attached in Attachment B.

The RTC software provided the ability to simulate trains operating under "deterministic" and "randomized" conditions. Simulating under *deterministic* operations, all train equipment initially enters service on-time and follows the fixed departure and dwell times at stations according to the proposed schedules. In this scenario, it is anticipated that the model would determine that all trains would operate at 100% on time, as may occur under ideal conditions. However, in order to evaluate the more realistic occurrences that occur on the railroad on a daily basis, it is necessary to simulate the operations under *randomized* conditions, which would allow for the introduction of randomized delays to the simulation in order to observe the effects on the operations. This is important in order to determine the overall stability of an operation. Random delays happen in real day-to-day operations due to signal or track maintenance, malfunctioning equipment or disabled trains, or conflicts with other operations. After inputting existing operating plans into the RTC model under deterministic conditions, the simulation is run under randomized conditions to determine more realistic effects on existing operations.

The simulation models for the alternatives were run under deterministic and randomized conditions as described below.

7.1. Deterministic Simulation Results

Tables 1 and 2 summarize the delay and OTP statistics of the deterministic (also referred to as "non-randomized") simulation results for the PM peak period (4:00 PM to 7:30 PM) for Alternative 2 and Alternative 3, respectively. The deterministic results for both Alternative 2 and Alternative 3 indicate that the proposed infrastructure would support proposed future operations and meet the MBTA Commuter Rail Schedule Adherence Standard and Amtrak target, exceeding the on-time performance threshold with 100% of all trips departing and arriving at terminals within five minutes of scheduled departure and arrival times. Achieving 100% on-time performance indicates that the model is accurate and that the proposed infrastructure can support the proposed service under deterministic conditions.

While on-time performance under non-randomized conditions is intended be 100% in order to test the stability of the model, delay is defined as the difference between the minimum, or unopposed, run time, and the actual run time required to traverse the route. The percentage of delay represents the extra time it takes a train to travel its route due to conflicts with other trains. As such, a percentage of delay will always be found in a model with mixed traffic, even under deterministic conditions. However, lower delay percentages are preferred and can be utilized to compare infrastructure alternatives to compare the amount of flexibility that the proposed infrastructure has to support the proposed operations. Delays due to each conflict are combined to determine the total percentage of delays for each type of service, as well as for the total operation.

Table 1 — Alternative 2 – Non-Randomized OTP Results

Train Type	Delay Percentage (%)	On-Time Performance (%)
MBTA	2 %	100 %
Amtrak Acela	< 1 %	100 %
Amtrak Regional	5 %	100 %
Amtrak NE Regional	< 1 %	100 %
Total	**2 %**	**100 %**

Table 2 — Alternative 3 – Non-Randomized OTP Results

Train Type	Delay Percentage (%)	On-Time Performance (%)
MBTA	2 %	100 %
Amtrak Acela	< 1 %	100 %
Amtrak Regional	7 %	100 %
Amtrak NE Regional	< 1 %	100 %
Total	**2 %**	**100 %**

The 2035 operations analysis string line diagrams, presented in Attachment C, further demonstrate that the future PM peak period operations, in the idealized conditions, would exceed all MBTA and Amtrak targets. The attached Future Platform Track Occupancy Charts represent the South Station berthing times and platform locations applied in this PM peak period weekday simulation analysis, under deterministic conditions.

7.2. Randomized Simulation Results

As noted previously, simulating under randomized conditions allows for the introduction of randomized delays to the simulation in order to observe the effects on the operations, which helps determine the overall stability of an operation. Random delays happen in real day-to-day operations due to signal or track maintenance, malfunctioning equipment or disabled trains, or conflicts with other operations. For this analysis, the randomization parameters for all inbound Amtrak and MBTA Commuter Rail services were set to randomly delay train station dwell times by up to a maximum of three minutes for Amtrak and up to a maximum of four minutes for the MBTA at Back Bay Station. Train departure times at JFK Station were set to be randomly delayed up to a maximum of four minutes for MBTA Old Colony Line inbound service. Train departure times at Readville Station were set to be randomly delayed up to a maximum of four minutes for MBTA Fairmount Line inbound service. After successfully inputting the proposed future Amtrak and MBTA operations under deterministic conditions, the simulation was dispatched under randomized conditions to determine each alternatives' ability to accommodate future levels of service under realistic settings.

The randomized simulations were run a total of ten times, omitting the two worst and two best simulation results to obtain average results with the remaining simulation runs. Averaged delay[8] and OTP[9] statistics for the simulation runs were then calculated to determine the impact of the Tower 1 Interlocking layout on future South Station operations. The randomized simulations were run to test the overall stability of the operation and compare the results of Alternatives 2 and 3. For the most congested time at South Station, the PM peak period (4:00 PM to 7:30 PM), the results of the OTP and delay analysis are shown in Tables 3 and 4 under randomized conditions. The results for each individual trainset are also provided in Attachment E. As shown below, on-time performance as well as delays due to each conflict were combined to determine the total percentage of OTP and delays for each type of service, as well as for the total operation. The averaged total delay percentage was 7% for all trains, MBTA and Amtrak, in Alternative 2. The average OTP of all trains was approximately 96% for all MBTA and Amtrak trains. These results indicate that the proposed Alternative 2 infrastructure is robust and flexible enough to

[8] The delay percentage represents the percentage of time trains are operating at less than their maximum or optimal operating speed, and demonstrates the amount of flexibility the given infrastructure has to support the simulated operations.

[9] According to the MBTA Service Delivery Policy (June 2, 2010), a train is considered on time if it is arriving or departing at a terminal station within 5 minutes of scheduled arrival and departure times. The MBTA Commuter Rail Schedule Adherence Standard for OTP is 95%. Amtrak's target is 95% OTP for Acela and Regional services, according to the Amtrak Intercity Passenger Rail On-Time Performance: Twentieth Quarterly Report to Congress (February 2013, viewed June 12, 2013 at www.fra.dot.gov).

provide reliable service given the proposed track configuration layout and increase in future 2035 trip volumes.

Table 3 — Alternative 2 – Randomized OTP Results

Train Type	Delay Percentage (%)	On-Time Performance (%)
MBTA	7 %	96 %
Amtrak Acela	7 %	100 %
Amtrak Regional	7 %	100 %
Amtrak NE Regional	6 %	100 %
Total	**7 %**	**96 %**

As shown in Table 4, the averaged total delay percentage for Alternative 3 was determined to be 13% for all MBTA and Amtrak trains. The averaged total OTP was determined to be approximately 94%, with 100% of Amtrak trains arriving at 100% OTP and MBTA slightly less at 93%. These results indicate the proposed Alternative 3 infrastructure is robust and flexible enough to provide reliable service given the proposed track configuration layout and increase in future 2035 trip volumes.

Table 4 — Alternative 3 – Randomized OTP Results

Train Type	Delay Percentage (%)	On-Time Performance (%)
MBTA	13 %	93 %
Amtrak Acela	13 %	100 %
Amtrak Regional	13 %	100 %
Amtrak NE Regional	15 %	100 %
Total	**13%**	**94 %**

8. Findings

As described previously, the purpose of this analysis was to evaluate operationally Constrained Rail Alternatives 2 and 3. Operations simulation modeling was conducted for these alternatives and the findings of this analysis was included as a one criterion, of several, in the FEIR Appendix D - *Track Configuration Alternatives Analysis - Tier 2 Screening Technical Report,* which was used to identify a preferred track configuration for South Station. The main findings from the rail operations analysis are as follows:

- Alternative 2 provides seven additional platform tracks and reconfigures Tower 1 Interlocking in its entirety. This alternative maximizes the number of parallel moves through the terminal to increase operational efficiency to the greatest extent possible, and reduces special trackwork in Tower 1 Interlocking.

- Alternative 3 provides seven additional platform tracks and minimizes the amount of new trackwork by connecting to the existing South Station track configuration to the greatest extent possible. Special trackwork was provided to the existing Tower 1 Interlocking to maximize access to platform tracks from each approach track.

Operations simulation modeling was conducted for the alternatives and evaluated for their capacity to meet future South Station operational needs, as measured by their ability to accommodate future service plans and meet OTP and delay goals, described as follows:

- **Accommodate Future Service Plans**. By the year 2035, Amtrak projects 80 weekday revenue trips and 58 weekday non-revenue trips, representing a 100% revenue service increase above current levels. By 2035, the MBTA projects up to 315 weekday revenue trips and 101 weekday non-revenue trips, representing a 13% revenue service increase above current levels. Projections of train movements in and out of South Station are estimated to be a total of 554 daily trains by the year 2035, representing an overall increase of 23% above current revenue service levels.[10]
- **Meet OTP and Delay Goals**. OTP and delay goals have been established for the South Station complex, which includes the South Station platforms, Tower 1 Interlocking, and the key approach interlockings at Cove on the NEC and Broad in the Southampton Street area. OTP goals for the South Station area are consistent with the current service delivery policy goals of 95% OTP for MBTA[11] commuter rail trains and 95% OTP for Amtrak Acela and Northeast Regional services.[12] The delay percentage represents the percentage of time the trains are operating at less than their maximum or optimal operating speed, and demonstrates the amount of flexibility the given infrastructure has to support the simulated operations. Delay goals are generally to minimize the percentage by which trains are delayed. Delay percentage is a useful statistic to compare infrastructure alternatives and judge their overall operational stability, as it shows the amount of flexibility the infrastructure alternatives have to support a given operating plan.

The operations simulation models were developed for each alternative and were evaluated for how each would support future 2035 service levels, as well as on their OTP and delay performance. Additionally, operational efficiencies and limitations of each alternative were identified and are summarized below.

- **Ability to Meet Future Service Goals.** Both Alternative 2 and Alternative 3 would meet the 2035 future service plans for the MBTA and Amtrak.

- **Ability to Meet OTP and Delay Goals**. The average OTP during the PM peak period was simulated to be 96% for Alternative 2 and 94% for Alternative 3. Average delay in this condition was found to be 7% for Alternative 2 and 13% for Alternative 3. While the results show that trains in Alternative 2 experience less delay and greater OTP than in Alternative 3, these results indicate that both alternatives are robust and flexible enough to provide reliable service given the increase in future 2035 trip volumes.

- **Operational Efficiencies/Limitations.** Operational efficiencies related to parallel moves through the Tower 1 interlocking and access to tracks and platforms were evaluated for each alternative.

[10] 2035 revenue service level weekday train movements are based on Massachusetts Department of Transportation. *Basis of Operations Analysis and Assumptions Verification Report*, Version 4. November 2014.

[11] According to the MBTA *Service Delivery Policy* (June 2, 2010), a train is considered 100% on time if it is arriving or departing at a terminal station within 5 minutes of scheduled arrival and departure times. The MBTA Commuter Rail Schedule Adherence Standard for OTP is 95%.

[12] Amtrak Intercity Passenger Rail On-Time Performance: Twentieth Quarterly Report to Congress, February 2013. Viewed June 12, 2013 at www.fra.dot.gov.

Alternative 2 would require substantially less special trackwork through the Tower 1 Interlocking, providing for more efficient access between the approach tracks and the platform tracks, and allowing up to eight simultaneous parallel moves through the terminal.

Alternative 3 would not provide the same level of operational efficiency or number of parallel moves as Alternative 2; but it would provide increased flexibility for non-revenue moves between the station platform tracks and the South Side layover facilities with two ladders to access the Dorchester Branch tracks. However, the extent of special trackwork throughout the Alternative 3 Tower 1 Interlocking layout poses several challenges for operations in the terminal:

- It is not possible to connect NEC Track 3 as its own approach track into the terminal, requiring the track to combine with NEC Track 5 approach track. Trains approaching on this track would only be able to access platform Tracks 1-6, forcing NEC trains needing to reach higher platform tracks to approach the terminal on NEC Tracks 1 or 2.
- Trains moving between the NEC and platform Tracks 14-16 could only do so via NEC Track 2. This operational challenge makes berthing trains on platform Tracks 14-16 less preferable if the trains are turning for outbound NEC revenue service, unless there is no other alternative. If it is necessary to berth trains on these platforms that are turning for outbound NEC service, the operating plan must allow for the outbound move via NEC Track 2 in between any inbound service from the NEC or route the inbound service to avoid creating conflicts and delay on NEC Track 2.
- The Alternative 3 layout would limit the ability for Fairmount Line trains to access the station without conflicting with other services. Access to Platform Track 17 can only be reached from Old Colony Track 19. Any train moving between the Fairmount Line/Dorchester Branch tracks and platform Track 16 would conflict with trains moving to or from platform Tracks 14 or 15, and if the train is moving to or from Dorchester Branch Track 1 it would prevent other trains from making simultaneous moves between NEC Track 2 and any platform track.

Attachment A – Future 2035 Operating Plans

Future 2035 MBTA Equipment Cycle
Future 2035 South Station Platform Track Occupancy Chart

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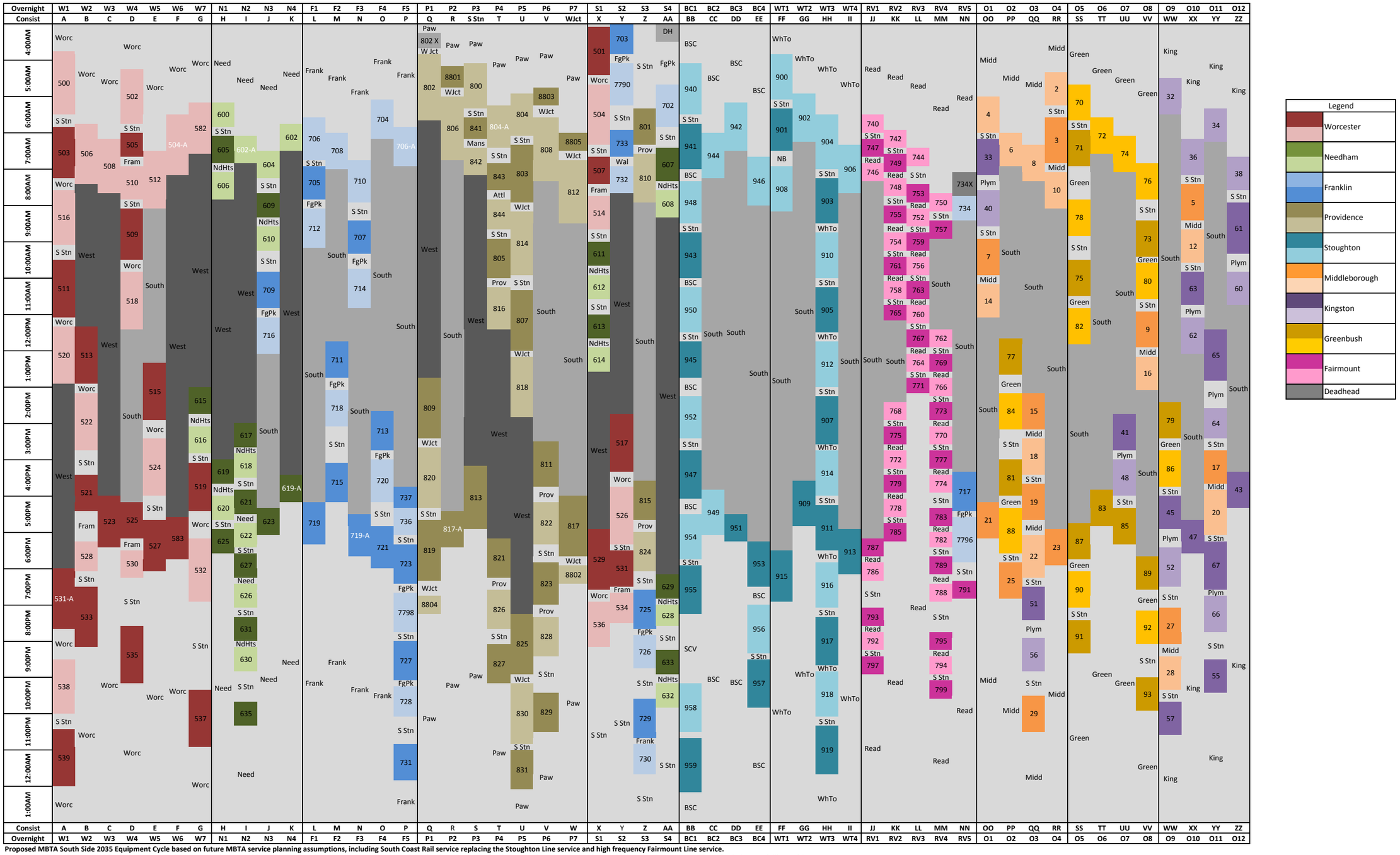


Proposed MBTA South Side 2035 Equipment Cycle based on future MBTA service planning assumptions, including South Coast Rail service replacing the Stoughton Line service and high frequency Fairmount Line service.
Assumes additional MBTA midday layover space at locations on the West side at the proposed Beacon Park Yard (BPY) and another location yet to be determined on the South side, in addition to existing MBTA S&I and Existing Readville Yard 2.
Assumes expanded MBTA overnight layover at terminal yards for each line.
Current configuration represents 52 active consists with 14 spares.

South Station Expansion Project - Operations Analysis
Proposed Future 2035 Track Occupancy Chart

December, 2015

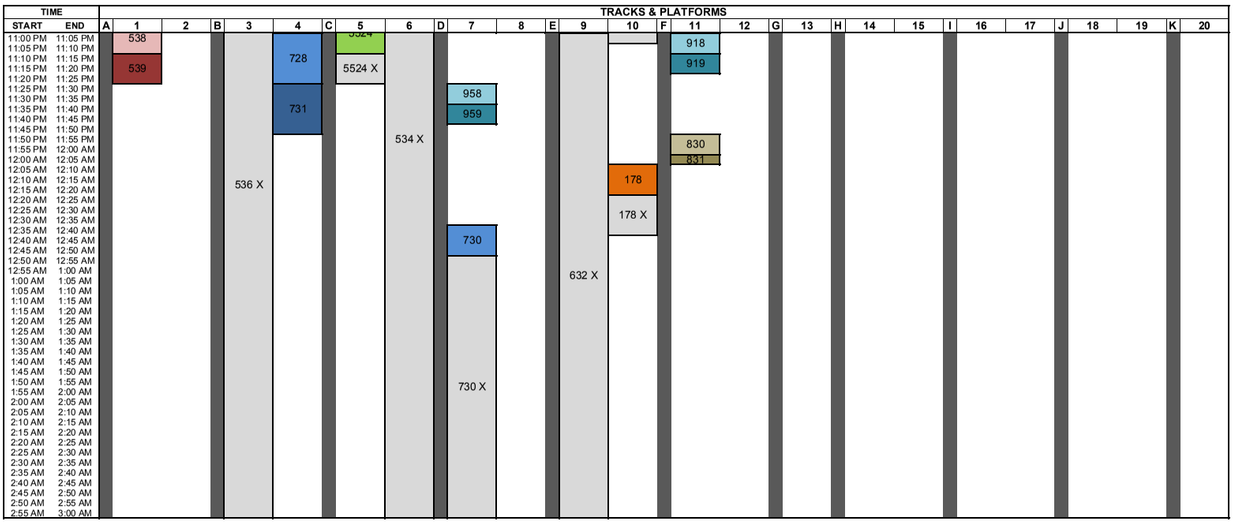
Project #12076.00

Legend

- Worcester
- Needham
- Franklin
- Providence
- Stoughton
- Middleborough
- Kingston
- Greenbush
- Fairmount
- Deadhead & Non-Revenue
- Acela
- Regional
- New England Regional
- Lake Shore Limited

TRACKS & PLATFORMS

TIME


TIME
START
END
TRACKS & PLATFORMS
A
1
2
B
3
4
C
5
6
D
7
8
E
9
10
F
11
12
G
13
H
14
15
I
16
17
J
18
19
K
20
538
539
728
731
5524 X
534 X
536 X
958
959
730
730 X
632 X
178
178 X
918
919
830
831

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Attachment B – Future 2035 Schedules

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Turn From	*Yard*	*Yard*	*501*	*Yard*	*Yard*	*Yard*	*Yard*	*505*	*Yard*	*507*	*503*	*509*	*511*	*513*	*515*	*517*	*521*	*525*	*519*	*531*	*529*	*531-A*
Northbound	**500**	**502**	**504**	**582**	**504-A**	**506**	**508**	**510**	**512**	**514**	**516**	**518**	**520**	**522**	**524**	**526**	**528**	**530**	**532**	**534**	**536**	**538**
Worcester	4:45	5:15	5:40	6:10	6:30	6:45	7:10		7:30		8:35	10:50	12:20	14:10	15:25	16:45			18:12		19:55	21:30
Grafton	5:00	5:29	5:54		6:44	6:59	7:24		7:44		8:48	11:03	12:33	14:23	15:38	16:58			18:25		20:08	21:42
Westborough	5:06	5:34	5:59		6:49	7:04	7:29		7:49		8:52	11:07	12:37	14:27	15:42	17:02			18:29		20:12	21:46
Southborough	5:16	5:43	6:08		6:58	7:13	7:38		7:58		9:01	11:16	12:46	14:36	15:51	17:11			18:38		20:21	21:54
Ashland	5:23	5:48	6:13		7:03	7:18	7:43		8:03		9:05	11:20	12:50	14:40	15:55	17:15			18:42		20:25	21:58
Framingham	5:35	6:00	6:25	6:50	7:15	7:30	7:55	7:55	8:14	8:45	9:16	11:31	13:01	14:51	16:06	17:26	18:15	18:28	18:53	19:42	20:36	22:08
W Natick	5:40	6:06	6:30		7:20	7:35	8:01	8:00	8:19	8:50	9:21	11:36	13:06	14:56	16:11	17:31	18:20	18:33	18:58	19:47		22:13
Natick	5:45	6:11	6:35		7:25	7:40	8:06	8:05	8:24	8:55	9:26	11:41	13:11	15:01	16:16	17:36	18:25	18:38	19:03	19:52		22:17
Wellesley Sq	5:51		6:41		7:31	7:46		8:11	8:30	9:01	9:32	11:47	13:16	15:06	16:22	17:42	18:31	18:44	19:09	19:58		22:22
Wellesley Hls	5:55		6:45		7:35	7:50		8:15	8:34	9:05	9:36	11:51	13:20	15:10	16:26	17:46	18:35	18:48	19:13	20:02		22:25
Wellesley Fms	5:58		6:48		7:38	7:53		8:18	8:37	9:08	9:39	11:54	13:23	15:13	16:29	17:49	18:38	18:51	19:16	20:05		22:28
Auburndale	6:03		6:53		7:43	7:58		8:23		9:13		11:59		15:18								
W Newton	6:06		6:56		7:46	8:01		8:26		9:16		12:02		15:21								
Newtonville	6:10		7:00		7:50	8:05		8:30		9:20		12:05		15:24								
New Balance	6:14	6:30	7:04	7:18	7:54	8:09	8:23	8:34	8:48	9:25	9:50	12:10	13:38	15:28	16:45	18:04	18:50	19:02	19:36	20:16	20:56	22:45
Yawkey	6:20	6:36	7:10		8:00	8:15		8:40					13:44	15:34		18:10			19:42			
Back Bay	6:25	6:41	7:15	7:27	8:05	8:20	8:32	8:45	8:57	9:34	9:59	12:19	13:49	15:39	16:54	18:15	18:59	19:11	19:47	20:25	21:05	22:54
S Stn	6:31	6:47	7:21	7:33	8:11	8:26	8:38	8:51	9:03	9:40	10:05	12:25	13:55	15:45	17:00	18:21	19:05	19:17	19:53	20:31	21:11	23:00
Turn To	*503*	*505*	*507*	*Yard*	*Yard*	*Yard*	*Yard*	*509*	*Yard*	*611*	*511*	*Yard*	*Yard*	*521*	*527*	*531*	*533*	*535*	*537*	*Yard*	*Yard*	*539*

Turn From	*Yard*	*500*	*502*	*504*	*510*	*516*	*Yard*	*Yard*	*Yard*	*616*	*522*	*Yard*	*Yard*	*Yard*	*524*	*Yard*	*526*	*Yard*	*528*	*530*	*532*	*538*
Southbound	**501**	**503**	**505**	**507**	**509**	**511**	**513**	**515**	**517**	**519**	**521**	**523**	**525**	**583**	**527**	**529**	**531**	**531-A**	**533**	**535**	**537**	**539**
S Stn	4:05	6:50	7:00	7:38	9:05	10:30	12:22	13:20	14:45	16:05	16:25	17:00	17:15	17:33	17:45	18:00	18:32	19:01	19:30	20:30	22:20	23:25
Back Bay	4:11	6:56	7:06	7:44	9:11	10:36	12:28	13:26	14:51	16:11	16:31	17:06	17:21	17:40	17:51	18:06	18:38	19:07	19:36	20:36	22:26	23:31
Yawkey						10:41					16:36		17:26		17:56		18:43	19:12	19:41	20:41	22:31	23:36
New Balance	4:20	7:05	7:15	7:53	9:20	10:47	12:37	13:35	15:00	16:20	16:42	17:15	17:32	17:48	18:02	18:15	18:49	19:18	19:47	20:47	22:37	23:42
Newtonville						10:50		13:38	15:03		16:46		17:36			18:21	18:52	19:21	19:50	20:50	22:40	23:45
W Newton						10:54		13:41	15:06		16:50		17:40			18:25	18:56	19:25	19:54	20:54	22:44	23:49
Auburndale						10:57		13:44	15:09		16:53		17:43			18:28	18:59	19:28	19:57	20:57	22:47	23:52
Wellesley Fms					9:27	11:02	12:52	13:49	15:14		16:58		17:48			18:33	19:04	19:33	20:02	21:02	22:52	23:57
Wellesley Hls		7:14		8:04	9:30	11:05	12:55	13:52	15:17		17:01		17:51		18:10	18:36	19:07	19:36	20:05	21:05	22:55	0:00
Wellesley Sq		7:18		8:08	9:34	11:09	12:59	13:56	15:21		17:05		17:55			18:40	19:11	19:40	20:09	21:09	22:59	0:04
Natick		7:22		8:14	9:40	11:15	13:05	14:02	15:27		17:11		18:01		18:14	18:46	19:17	19:46	20:15	21:15	23:05	0:10
W Natick		7:27		8:19	9:45	11:21	13:10	14:07	15:32	16:36	17:17	17:32	18:07		18:20	18:52	19:24	19:52	20:21	21:21	23:11	0:16
Framingham	4:45	7:32	7:39	8:25	9:50	11:27	13:15	14:13	15:38	16:42	17:23	17:40	18:13	18:12	18:27	18:58	19:30	19:57	20:26	21:26	23:16	0:21
Ashland		7:39			9:56	11:33	13:21	14:19	15:44	16:48		17:46			18:34	19:05		20:04	20:33	21:32	23:22	0:27
Southborough		7:44			10:01	11:38	13:26	14:24	15:49	16:53		17:51			18:39	19:10		20:09	20:38	21:37	23:27	0:32
Westborough		7:53			10:10	11:46	13:34	14:33	15:58	17:03		18:01			18:48	19:20		20:18	20:47	21:46	23:36	0:41
Grafton	5:05	8:01			10:17	11:51	13:39	14:39	16:04	17:09		18:08			18:54	19:26		20:24	20:53	21:52	23:42	0:47
Worcester	5:24	8:16			10:31	12:05	13:53	14:53	16:18	17:24		18:23		18:42	19:09	19:41		20:38	21:07	22:06	23:56	1:01
Turn To	*504*	*516*	*510*	*514*	*518*	*520*	*522*	*524*	*526*	*532*	*528*	*Yard*	*530*	*Yard*	*Yard*	*536*	*534*	*538*	*Yard*	*Yard*	*Yard*	*Yard*

Blue	Indicates L stop (regular stop, but train may leave ahead of schedule)
Red	Indicates f stop (train will not stop unless passengers notify conductor they wish to get off or passengers are visible waiting on the platform)
	Indicates peak hour trains
	Indicates trains not simulated as part of the PM Period Alternative 2 and Alternative 3 simulations

Based on MBTA Framingham/Worcester Line Schedule Effective April 29, 2013
Proposed Future 2035 Schedule includes one additional peak period, peak direction trip in each of the peak periods, identified with '-A' at the end of the train number.
Equipment Turns Based on Proposed Future 2035 Eq Cycle

Turn From	*Yard*	*Yard*	*Yard*	*Yard*	*605*	*607*	*609*	*611*	*613*	*615*	*617*	*619*	*621*	*627*	*629*	*631*	*633*
Northbound	600	602	602-A	604	606	608	610	612	614	616	618	620	622	626	628	630	632
Needham Hts	6:10	6:47	7:06	7:30	8:00	8:35	9:36	10:55	12:55	15:05	15:48	17:07	17:44	19:26	20:14	21:15	22:10
Neeham Ctr	6:14	6:51	7:10	7:34	8:04	8:39	9:39	10:59	12:59	15:09	15:52	17:11	17:48	19:30	20:18	21:19	22:14
Needham Jct	6:18	6:55	7:14	7:38	8:08	8:43	9:43	11:03	13:03	15:13	15:56	17:15	17:52	19:34	20:22	21:23	22:18
Hersey	6:21	6:58	7:18	7:42	8:12	8:46	9:46	11:06	13:06	15:16	15:59	17:22	17:55	19:37	20:25	21:26	22:21
W Roxbury	6:25	7:03	7:23	7:47	8:17	8:51	9:51	11:11	13:11	15:28	16:04	17:27	18:02	19:47	20:30	21:31	22:26
Highland	6:28	7:07	7:26	7:50	8:20	8:54	9:53	11:13	13:13	15:30	16:06	17:29		19:49		21:33	22:28
Bellevue	6:31	7:10	7:29	7:53	8:23	8:57	9:56	11:15	13:15	15:32	16:08	17:31		19:51		21:35	22:30
Roslindale	6:34	7:14	7:33	7:57	8:27	9:00	9:59	11:17	13:17	15:34	16:11	17:33		19:53		21:37	22:32
Forest Hills	6:37	7:17	7:36	8:00	8:30	9:03	10:03	11:20	13:20	15:37	16:13	17:36	18:13	19:56	20:37	21:40	22:35
Ruggles	6:42	7:22	7:41	8:05	8:35	9:09	10:08	11:24	13:24					20:00	20:41	21:44	22:39
Back Bay	6:46	7:26	7:45	8:09	8:39	9:13	10:12	11:28	13:28	15:45	16:20	17:44	18:21	20:04	20:45	21:48	22:42
S Stn	6:51	7:31	7:50	8:14	8:44	9:18	10:17	11:33	13:33	15:50	16:25	17:51	18:26	20:09	20:50	21:53	22:47
Turn To	*605*	*Yard*	*Yard*	*609*	*Yard*	*Yard*	*709*	*613*	*Yard*	*519*	*621*	*625*	*627*	*631*	*633*	*635*	*Yard*

Turn From	*600*	*702*	*604*	*514*	*612*	*Yard*	*Yard*	*Yard*	*Yard*	*618*	*Yard*	*620*	*622*	*Yard*	*626*	*628*	*630*
Southbound	605	607	609	611	613	615	617	619	619-A	621	623	625	627	629	631	633	635
S Stn	7:05	7:25	8:45	10:05	11:49	14:00	15:00	15:59	16:30	16:42	17:20	18:01	18:36	19:12	20:20	21:15	22:30
Back Bay	7:10	7:30	8:50	10:10	11:54	14:05	15:05	16:05	16:35	16:47	17:25	18:06	18:41	19:17	20:25	21:20	22:35
Ruggles					11:57	14:08	15:08	16:09	16:39	16:51		18:10	18:45	19:21	20:28	21:23	22:38
Forest Hills	7:16			10:17	12:02	14:14	15:13	16:15	16:44	16:56	17:34	18:15	18:50	19:26	20:33	21:28	22:43
Roslindale	7:20		9:04	10:20	12:05	14:18	15:16	16:18	16:47	16:59	17:37	18:18	18:53	19:29	20:36	21:31	22:46
Bellevue	7:22		9:06	10:22	12:07	14:21	15:18	16:21	16:50	17:02	17:40	18:21	18:56	19:32	20:39	21:34	22:49
Highland	7:24		9:08	10:24	12:09	14:23	15:20	16:23	16:53	17:05	17:43	18:24	18:58	19:34	17:45	21:36	22:51
W Roxbury	7:26	7:42	9:10	10:26	12:11	14:27	15:22	16:25	16:56	17:08	17:49	18:27	19:00	19:41	17:47	21:38	22:53
Hersey	7:32	7:54	9:15	10:32	12:16	14:32	15:27	16:30	17:01	17:15	17:54	18:32	19:05	19:46	17:52	21:43	22:58
Needham Jct	7:42	8:12	9:18	10:35	12:19	14:35	15:30	16:33	17:04	17:18	17:58	18:35	19:08	19:49	17:55	21:46	23:01
Needham Ctr	7:46	8:16	9:22	10:39	12:23	14:39	15:34	16:37	17:08	17:22	18:02	18:39	19:12	19:53	17:59	21:50	23:05
Needham Hts	7:50	8:20	9:26	10:43	12:27	14:43	15:38	16:42	17:12	17:26	18:06	18:43	19:16	19:57	18:03	21:54	23:09
Turn To	*606*	*608*	*610*	*612*	*614*	*616*	*618*	*620*	*Yard*	*622*	*Yard*	*Yard*	*626*	*628*	*630*	*632*	*Yard*

Blue	Indicates L stop (regular stop, but train may leave ahead of schedule)
	Indicates peak hour trains
	Indicates trains not simulated as part of the PM Period Alternative 2 and Alternative 3 simulations

Based on MBTA Needham Line Schedule Effective July 1, 2012
Proposed Future 2035 Schedule includes one additional peak period, peak direction trip in each of the peak periods, identified with '-A' at the end of the train number.
Equipment Turns Based on Proposed Future 2035 Eq Cycle

Turn From	*703*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*733*	*Yard*	*Yard*	*705*	*707*	*709*	*711*	*713*	*737*	*717*	*723*	*725*	*727*	*729*
Northbound	**7790**	**702**	**704**	**706**	**706-A**	**708**	**732**	**710**	**734**	**712**	**714**	**716**	**718**	**720**	**736**	**7796**	**7798**	**726**	**728**	**730**
Forge Park/495	5:05	5:40	6:04	6:35	6:52	7:02		7:48		9:03	10:45	12:05	14:05	16:01		17:36	19:40	20:50	22:15	23:50
Franklin	5:10	5:47	6:11	6:42	6:59	7:09		7:55		9:10	10:52	12:12	14:12	16:08		17:43	19:47	20:57	22:22	23:57
Norfolk	5:19	5:54	6:18	6:49	7:06	7:16		8:02		9:17	10:59	12:19	14:19	16:15		17:49	19:53	21:03		
Walpole	5:25	6:00	6:24	6:55	7:12	7:23	7:55	8:08		9:24	11:06	12:26	14:26	16:21		17:56	20:00	21:09	22:33	0:08
Plimptonville				6:58																
Windsor Gdns	5:29	6:07	6:28	7:01	7:16	7:27	7:59	8:12		9:29	11:11	12:31	14:31	16:25		18:01				
Norwood Ctrl	5:33	6:12	6:32	7:06	7:20	7:32	8:03	8:17	8:51	9:33	11:15	12:35	14:35	16:29	17:23	18:05	20:07	21:16	22:39	0:14
Norwood Dpt	5:36	6:15	6:36	7:09	7:24		8:06	8:20	8:53	9:35	11:17	12:37	14:37	16:32		18:07		21:18		
Islington	5:39	6:18	6:39	7:12	7:27		8:09	8:23	8:56	9:39	11:21	12:41	14:41	16:37		18:11		21:22		
Dedham Corp	5:42	6:21	6:42	7:16	7:30	7:37		8:26	8:58	9:42	11:24	12:44	14:44	16:41	17:41	18:14	20:16	21:25	22:44	0:19
Endicott	5:45	6:24	6:45	7:20	7:33		8:13	8:30	9:00	9:44	11:26	12:46	14:46	16:45		18:17		21:27		
Readville	5:48	6:28	6:48	7:23	7:36		8:19	8:34	9:05	9:47	11:29	12:49	14:49	16:49		18:25				
Hyde Park	VIA	6:32			VIA										VIA	VIA				
Ruggles	FAIR	6:41	6:59	7:34	FAIR	7:52	8:32	8:47	9:19	9:59	11:39	12:57	15:00		FAIR	FAIR				
Back Bay	LINE	6:45	7:03	7:38	LINE	7:56	8:36	8:52	9:24	10:03	11:43	13:01	15:04	17:04	LINE	LINE		21:40	23:01	0:36
S Stn	6:15	6:50	7:08	7:43	8:00	8:01	8:41	8:57	9:29	10:08	11:48	13:06	15:09	17:09	18:05	18:55	20:45	21:45	23:06	0:41
Turn To	*733*	*607*	*Yard*	*705*	*Yard*	*Yard*	*Yard*	*707*	*Yard*	*Yard*	*Yard*	*Yard*	*715*	*721*	*723*	*791*	*727*	*729*	*731*	*Yard*

Turn From	*Yard*	*7790*	*706*	*710*	*610*	*Yard*	*Yard*	*718*	*Yard*	*Yard*	*Yard*	*Yard*	*720*	*736*	*824*	*798*	*726*	*728*
Southbound	**703**	**733**	**705**	**707**	**709**	**711**	**713**	**715**	**717**	**737**	**719**	**719-A**	**721**	**723**	**725**	**727**	**729**	**731**
S Stn	4:00	6:55	7:57	9:24	10:50	12:45	14:40	16:06	16:21	16:39	17:10	17:40	17:52	18:25	19:35	21:00	22:37	23:50
Back Bay			8:02	9:29	10:55	12:50	14:45	16:11	16:26	VIA	17:15	VIA	17:57	18:30	19:40	21:05	22:42	23:55
Ruggles						12:53	14:48	16:15	16:30	FAIR	17:19	FAIR	18:01	18:34	19:43	21:08	22:45	23:58
Hyde Park								16:24	16:39	LINE		LINE	18:11				22:54	
Readville		7:12		9:40	11:05	13:03	14:58	16:28	16:43	17:07		18:03	18:14	18:42	19:53	21:18	22:57	0:08
Endicott		7:16		9:43	11:08	13:06	15:01	16:32		17:12		18:07	18:18	18:46	19:56	21:22	23:02	0:11
Dedham Corp		7:19	8:17	9:45	11:10	13:08	15:04	16:35	16:48	17:14	17:33	18:10	18:22	18:49	19:59	21:24	23:04	0:13
Islington		7:22	8:19		11:13	13:11	15:06	16:38		17:17		18:13	18:24	18:52	20:02	21:27	23:07	0:16
Norwood Dpt		7:25		9:50	11:16	13:14	15:10	16:41	16:53	17:20	17:38	18:16	18:27	18:55	20:05	21:30	23:10	0:19
Norwood Ctrl	4:22	7:32	8:24	9:53	11:19	13:17	15:13	16:45	16:57	17:23	17:41	18:20	18:30	18:58	20:08	21:33	23:12	0:21
Windsor Gdns			8:28	9:57	11:23	13:21	15:17	16:49	17:01		17:44	18:24	18:34	19:02	20:12	21:37	23:16	0:25
Plimptonville											17:48							
Walpole	4:28	7:42	8:32	10:01	11:28	13:26	15:21	16:54	17:06		17:52	18:29	18:42	19:07	20:17	21:41	23:20	0:29
Norfolk			8:38	10:07	11:34	13:32	15:28	17:01	17:13		18:04	18:36	18:50	19:15	20:25	21:48	23:27	0:36
Franklin	4:40		8:45	10:14	11:42	13:40	15:36	17:09	17:21		18:12	18:44	18:56	19:23	20:33	21:56	23:35	0:44
Forge Park/495	4:50		8:52	10:21	11:49	13:47	15:46	17:16	17:28		18:19	18:51	19:03	19:30	20:40	22:03	23:42	0:51
Turn To	*7790*	*732*	*712*	*714*	*716*	*718*	*720*	*Yard*	*7796*	*736*	*Yard*	*Yard*	*Yard*	*7798*	*726*	*728*	*730*	*Yard*

Blue	Indicates L stop (regular stop, but train may leave ahead of schedule)
Red	Indicates f stop (train will not stop unless passengers notify conductor they wish to get off or passengers are visible waiting on the platform)
	Indicates peak hour trains
	Indicates trains not simulated as part of the PM Period Alternative 2 and Alternative 3 simulations

Based on MBTA Franklin Line Schedule Effective July 1, 2012
Proposed Future 2035 Schedule includes one additional peak period, peak direction trip in each of the peak periods, identified with '-A' at the end of the train number.
Equipment Turns Based on Proposed Future 2035 Eq Cycle

Turn From	*703*	*Yard*	*Yard*	*Yard*	*Yard*	*747*	*749*	*Yard*	*753*	*755*	*759*	*761*	*763*	*Yard*	*767*	*769*	*Yard*	*773*	*775*	*777*	*779*	*737*	*783*	*717*	*787*	*789*	*793*	*795*
Northbound	**7790**	**740**	**742**	**744**	**706-A**	**746**	**748**	**750**	**752**	**754**	**756**	**758**	**760**	**762**	**764**	**766**	**768**	**770**	**772**	**774**	**778**	**736**	**782**	**7796**	**786**	**788**	**792**	**794**
Readville	5:48	6:30	6:55	7:24	7:36	7:50	8:15	8:40	9:07	9:45	10:25	11:05	11:45	12:25	13:05	13:45	14:25	15:05	15:45	16:25	17:05	17:41	17:58	18:25	18:50	19:25	20:45	21:25
Fairmount	5:53	6:34	6:59	7:28	7:41	7:54	8:19	8:44	9:10	9:48	10:28	11:08	11:48	12:28	13:08	13:48	14:28	15:08	15:48	16:28	17:08	17:46	18:01	18:32	18:53	19:28	20:48	21:28
Blue Hill Av		6:38	7:03	7:32		7:58	8:23	8:48	9:14	9:52	10:32	11:12	11:52	12:32	13:12	13:52	14:32	15:12	15:52	16:32	17:12		18:05		18:57	19:32	20:52	21:32
Morton St	5:58	6:41	7:06	7:35	7:46	8:01	8:26	8:51	9:17	9:55	10:35	11:15	11:55	12:35	13:15	13:55	14:35	15:15	15:55	16:35	17:15	17:51	18:08	18:36	19:00	19:35	20:55	21:35
Talbot Av		6:45	7:10	7:39		8:05	8:29	8:55	9:20	9:58	10:38	11:18	11:58	12:38	13:18	13:58	14:38	15:18	15:58	16:38	17:18		18:11		19:03	19:38	20:58	21:38
Four Cnrs		6:48	7:13	7:42		8:08	8:33	8:58	9:23	10:01	10:41	11:21	12:01	12:41	13:21	14:01	14:41	15:21	16:01	16:41	17:21		18:14		19:06	19:41	21:01	21:41
Uphams Cnr	6:03	6:51	7:16	7:45	7:51	8:11	8:36	9:01	9:26	10:04	10:44	11:24	12:04	12:44	13:24	14:04	14:44	15:24	16:04	16:44	17:24	17:57	18:17	18:45	19:09	19:44	21:04	21:44
Newmarket		6:54	7:19	7:48		8:14	8:39	9:04	9:28	10:06	10:46	11:26	12:06	12:46	13:26	14:06	14:46	15:26	16:06	16:46	17:26		18:19		19:11	19:46	21:06	21:46
S Stn	6:15	7:02	7:27	7:56	8:00	8:22	8:47	9:12	9:36	10:14	10:54	11:34	12:14	12:54	13:34	14:14	14:54	15:34	16:14	16:54	17:34	18:05	18:27	18:55	19:19	19:54	21:14	21:54
Turn To	*733*	*747*	*749*	*753*	*Yard*	*Yard*	*755*	*757*	*759*	*761*	*763*	*765*	*767*	*769*	*771*	*773*	*775*	*777*	*779*	*783*	*785*	*723*	*789*	*791*	*793*	*795*	*797*	*799*

Turn From	*740*	*742*	*744*	*748*	*750*	*752*	*754*	*756*	*758*	*760*	*762*	*764*	*766*	*768*	*770*	*772*	*Yard*	*774*	*Yard*	*778*	*Yard*	*782*	*7796*	*786*	*788*	*792*	*794*
Southbound	**747**	**749**	**753**	**755**	**757**	**759**	**761**	**763**	**765**	**767**	**769**	**771**	**773**	**775**	**777**	**779**	**737**	**783**	**719-A**	**785**	**787**	**789**	**791**	**793**	**795**	**797**	**799**
S Stn	7:12	7:37	8:25	9:02	9:26	9:47	10:27	11:07	11:44	12:27	13:07	13:44	14:27	15:07	15:47	16:27	16:39	17:20	17:40	17:45	18:12	18:40	19:20	20:07	20:47	21:27	22:07
Newmarket	7:19	7:44	8:32	9:09	9:33	9:54	10:34	11:14	11:51	12:34	13:14	13:51	14:34	15:14	15:54	16:34	16:46	17:27		17:52	18:19	18:47	19:27	20:14	20:54	21:34	22:14
Uphams Cnr	7:21	7:46	8:34	9:11	9:35	9:56	10:36	11:16	11:53	12:36	13:16	13:53	14:36	15:16	15:56	16:36	16:48	17:29	17:48	17:54	18:21	18:49	19:29	20:16	20:56	21:36	22:16
Four Cnrs	7:24	7:49	8:37	9:14	9:38	9:59	10:39	11:19	11:56	12:39	13:19	13:56	14:39	15:19	15:59	16:39	16:51	17:32		17:57	18:24	18:52	19:32	20:19	20:59	21:39	22:19
Talbot Av	7:27	7:52	8:40	9:17	9:41	10:02	10:42	11:22	11:59	12:42	13:22	13:59	14:42	15:22	16:02	16:42	16:54	17:35		18:00	18:27	18:55	19:35	20:22	21:02	21:42	22:22
Morton St	7:30	7:55	8:43	9:20	9:44	10:05	10:45	11:25	12:02	12:45	13:25	14:02	14:45	15:25	16:05	16:45	16:57	17:38	17:54	18:03	18:30	18:58	19:38	20:25	21:05	21:45	22:25
Blue Hill Av	7:33	7:58	8:46	9:23	9:47	10:08	10:48	11:28	12:05	12:48	13:28	14:05	14:48	15:28	16:08	16:48	17:00	17:41		18:06	18:33	19:01	19:41	20:28	21:08	21:48	22:28
Fairmount	7:36	8:01	8:49	9:26	9:50	10:11	10:51	11:31	12:08	12:51	13:31	14:08	14:51	15:31	16:11	16:51	17:03	17:44	17:59	18:09	18:36	19:04	19:44	20:31	21:11	21:51	22:31
Readville	7:40	8:05	8:53	9:30	9:54	10:15	10:55	11:35	12:12	12:55	13:35	14:12	14:55	15:35	16:15	16:55	17:07	17:48	18:03	18:13	18:40	19:08	19:48	20:35	21:15	21:55	22:35
Turn To	*746*	*748*	*752*	*754*	*Yard*	*756*	*758*	*760*	*Yard*	*764*	*766*	*Yard*	*770*	*772*	*774*	*778*	*736*	*782*	*Yard*	*Yard*	*786*	*788*	*Yard*	*792*	*794*	*Yard*	*Yard*

Red	Indicates f stop (train will not stop unless passengers notify conductor they wish to get off or passengers are visible waiting on the platform)
Blue	Indicates L stop (regular stop, but train may leave ahead of schedule)
	Indicates Franklin train sent via Fairmount
	Indicates peak hour trains
	Indicates trains not simulated as part of the PM Period Alternative 2 and Alternative 3 simulations

Based on MBTA Fairmount Line Service Levels specified by CTPS in the "Description of Modeling Assumptions and Analysis Methodology for the State Implementation Plan Transit Commitment Projects Current and Proposed Substitutions" report prepared for the Executive Office of Transportation on March 13, 2007.
Equipment Turns Based on Proposed Future 2035 Eq Cycle

Turn From	*Yard*	*Yard*	*Yard*	*Yard*	*8801*	*841*	*8803*	*801*	*8805*	*843*	*803*	*805*	*807*	*809*	*811*	*815*	*817*	*821*	*819*	*823*	*825*
Northbound	**800**	**802**	**804**	**804-A**	**806**	**842**	**808**	**810**	**812**	**844**	**814**	**816**	**818**	**820**	**822**	**824**	**8802**	**826**	**8804**	**828**	**830**
Wickford Jct		4:52			5:57		6:43		7:34		9:10		13:10	15:40			18:55		19:45		22:10
TF Green		5:07			6:12		6:58		7:51		9:26		13:25	15:54			19:09		19:59		22:24
Providence	5:07	5:27	5:53	6:13	6:32		7:18	7:35	8:07		9:45	11:15	13:41	16:10	17:08	18:00	19:25	19:37	20:15	20:24	22:40
S Attleboro	5:17	5:37	6:02	6:22	6:41		7:28	7:45	8:16		9:54	11:25	13:52	16:20	17:18	18:10		19:47		20:34	22:50
Attleboro	5:27	5:47	6:14	6:34	6:51		7:38	7:55	8:26	8:54	10:04	11:34	14:02	16:30	17:27	18:18		19:56		20:43	22:59
Mansfield	5:36	5:54	6:24	6:44	7:03	7:26	7:50	8:05	8:36	9:03	10:12	11:42	14:12	16:38	17:36	18:26		20:04		20:51	23:08
Sharon	5:44	6:04	6:34	6:54	7:13	7:35		8:15	8:47	9:11	10:21	11:51	14:21	16:47	17:44	18:34		20:12		20:59	23:18
Canton Jct	5:51	6:09				7:41		8:23	8:55	9:18	10:28	11:58			17:51						23:26
Route 128	5:56	6:16	6:44	7:03	7:22	7:47		8:30	9:00	9:20	10:33	12:03	14:30	16:58	17:56	18:47		20:25		21:12	23:31
Hyde Park	6:01	6:21				7:52		8:35	9:05		10:38	12:08			18:02						23:36
Ruggles	6:10	6:30	6:55	7:15	7:34	8:01	8:16	8:43	9:15	9:33	10:45	12:15	14:42	17:11							
Back Bay	6:14	6:34	6:59	7:19	7:38	8:05	8:20	8:47	9:19	9:37	10:49	12:20	14:45	17:15	18:13	18:58		20:36		21:23	23:45
S Stn	6:19	6:39	7:04	7:25	7:44	8:10	8:25	8:53	9:24	9:42	10:54	12:25	14:50	17:20	18:18	19:03		20:41		21:28	23:50
Turn To	*841*	*Yard*	*803*	*843*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*805*	*807*	*Yard*	*Yard*	*819*	*823*	*725*	*Yard*	*827*	*Yard*	*829*	*831*

Turn From	*Yard*	*Yard*	*Yard*	*800*	*Yard*	*804*	*804-A*	*844*	*814*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*820*	*Yard*	*822*	*Yard*	*826*	*828*	*830*
Southbound	**8801**	**8803**	**801**	**841**	**8805**	**803**	**843**	**805**	**807**	**809**	**811**	**813**	**815**	**817**	**817-A**	**819**	**821**	**823**	**825**	**827**	**829**	**831**
S Stn			6:20	6:35		7:20	7:51	10:00	11:20	13:45	15:35	16:10	16:37	17:00	17:28	17:45	18:14	18:50	20:12	21:07	22:24	23:59
Back Bay			6:25	6:40		7:25	7:56	10:05	11:25	13:50	15:40	16:15	16:42	17:05	17:33	17:50	18:19	18:55	20:17	21:12	22:29	0:04
Ruggles			6:28			7:28	7:59		11:28	13:53	15:43	16:18	16:45	17:09	17:37	17:54	18:23	18:58	20:20	21:15	22:32	0:07
Hyde Park								10:16	11:38	14:02	15:51	16:31						19:08	20:30	21:25	22:42	0:16
Route 128			6:40			7:40	8:11	10:21	11:43	14:08	15:57		16:56				18:33	19:13	20:35	21:30	22:47	0:21
Canton Jct						7:46	8:16	10:27	11:49	14:13	16:03		17:15		17:45			19:18	20:40	21:35	22:52	0:26
Sharon			6:49			7:52		10:33	11:55	14:19	16:11	16:46	17:07	17:27	17:55	18:12	18:41	19:24	20:46	21:41	22:58	0:31
Mansfield			6:56	7:08		7:59	8:29	10:40	12:02	14:27	16:20	16:55	17:16	17:36	18:05	18:24	18:51	19:33	20:54	21:49	23:06	0:39
Attleboro			7:05			8:07	8:38	10:48	12:10	14:35	16:30	17:05	17:26	17:50	18:18	18:32	19:00	19:42	21:02	21:57	23:14	0:48
S Attleboro			7:11			8:13		10:55	12:16	14:45	16:40	17:15	17:35	17:59	18:27	18:40	19:08	19:49	21:09	22:04	23:21	0:56
Providence	5:11	5:45	7:20		7:00	8:22		11:05	12:27	14:54	16:50	17:25	17:44	18:10		18:51	19:17	19:59	21:20	22:13	23:31	1:06
TF Green	5:27	6:01			7:16	8:38			12:43	15:10		17:40		18:26		19:07			21:36			
Wickford Jct	5:43	6:17			7:32	8:54			12:59	15:26		17:56		18:42		19:23			21:52			
Turn To	*806*	*808*	*810*	*842*	*812*	*814*	*844*	*816*	*818*	*820*	*822*	*Yard*	*824*	*8802*	*Yard*	*8804*	*826*	*828*	*830*	*Yard*	*Yard*	*Yard*

Blue	Indicates L stop (regular stop, but train may leave ahead of schedule)
	Indicates peak hour trains
	Indicates trains not simulated as part of the PM Period Alternative 2 and Alternative 3 simulations

Based on MBTA Providence Line Schedule Effective July 1, 2012
Proposed Future 2035 Schedule includes one additional peak period, peak direction trip in each of the peak periods, identified with '-A' at the end of the train number.
Equipment Turns Based on Proposed Future 2035 Eq Cycle

Turn From	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*901*	*941*	*903*	*943*	*905*	*945*	*907*	*947*	*911*	*953*	*917*	*955*
Northbound	**900**	**940**	**902**	**942**	**904**	**944**	**906**	**946**	**908**	**948**	**910**	**950**	**912**	**952**	**914**	**954**	**916**	**956**	**918**	**958**
Battleship Cv		5:08		6:16		7:02		7:46		8:17		11:07		14:10		17:30		20:01		22:10
Fall River		5:11		6:19		7:05		7:49		8:20		11:10		14:13		17:33		20:04		22:13
Freetown		5:17		6:26		7:12		7:56		8:27		11:16		14:19		17:39		20:12		22:20
Whale's Tooth	4:50		5:55		6:38		7:23		7:56		9:46		12:46		15:47		18:50		21:51	
King's Hwy	4:55		6:00		6:43		7:28		8:01		9:51		12:51		15:52		18:55		21:56	
Taunton Dep	5:07	5:28	6:13		6:57		7:41		8:15		10:03	11:27	13:03	14:30	16:04	17:50	19:10	20:24	22:08	22:31
Taunton	5:12	5:33	6:18		7:02		7:46		8:20		10:08	11:32	13:08	14:35	16:09	17:55	19:15	20:29	22:13	22:36
Raynham	5:18	5:39	6:25		7:09		7:53		8:27		10:14	11:38	13:14	14:41	16:15	18:01	19:26	20:35	22:19	22:42
Easton Vil	5:24	5:45	6:32		7:16		8:00		8:34		10:20	11:44	13:20	14:47	16:21	18:08		20:41	22:25	22:48
N Easton	5:28	5:49	6:36	6:50	7:20	7:36	8:04	8:20	8:38	8:51	10:24	11:48	13:24	14:51	16:25	18:12	19:34	20:45	22:29	22:52
Stoughton	5:32	5:53		6:54		7:40		8:24		8:55	10:28	11:52	13:28	14:55	16:29	18:16	19:38	20:49	22:33	22:56
Canton Ctr	5:38	5:59		7:01		7:47		8:31		9:02	10:34	11:58	13:34	15:01	16:35	18:22	19:44	20:55	22:39	23:02
Canton Jct	5:41	6:02		7:05		7:51		8:35		9:06	10:37	12:01	13:37	15:04	16:38	18:25	19:47	20:58	22:42	23:05
Route 128	5:46	6:07	6:51	7:10	7:35		8:19	8:40	8:53	9:11	10:42	12:06	13:42	15:09				21:03	22:47	23:10
Hyde Park		6:12	6:57	7:16	7:42	7:59	8:25	8:45			10:47	12:11	13:47	15:16	16:45		19:54		22:52	23:15
Ruggles	5:56		7:05		7:50					9:22										
Back Bay	6:00	6:21	7:09	7:25	7:55	8:10	8:36	8:55	9:05	9:27	10:56	12:20	13:56	15:26	16:55	18:38	20:03	21:14	23:01	23:24
S Stn	6:05	6:26	7:14	7:30	8:00	8:15	8:41	9:00	9:10	9:32	11:01	12:25	14:01	15:31	17:00	18:43	20:08	21:19	23:06	23:29
Turn To	*901*	*941*	*Yard*	*Yard*	*903*	*Yard*	*Yard*	*Yard*	*Yard*	*943*	*905*	*945*	*907*	*947*	*911*	*955*	*917*	*957*	*919*	*959*

Turn From	*900*	*940*	*904*	*948*	*910*	*950*	*912*	*952*	*Yard*	*Yard*	*914*	*Yard*	*Yard*	*Yard*	*Yard*	*954*	*916*	*956*	*918*	*958*
Southbound	**901**	**941**	**903**	**943**	**905**	**945**	**907**	**947**	**909**	**949**	**911**	**951**	**913**	**953**	**915**	**955**	**917**	**957**	**919**	**959**
S Stn	6:20	6:46	8:15	9:45	11:16	12:45	14:14	15:45	16:31	16:47	17:21	17:40	17:57	18:23	18:35	19:05	20:25	21:32	23:20	23:42
Back Bay	6:25	6:51	8:20	9:50	11:21	12:50	14:19	15:50	16:36	16:52	17:26	17:45	18:02	18:28	18:40	19:10	20:30	21:37	23:25	23:47
Ruggles						12:54	14:23		16:41	16:57		17:50			18:45	19:15	20:34		23:29	23:51
Hyde Park							14:30	16:00							18:54	19:23	20:43	21:48	23:36	23:59
Route 128	6:37	7:03	8:32	10:02	11:33	13:03	14:36				17:39		18:16	18:41	19:01	19:30			23:42	0:05
Canton Jct	6:43	7:09	8:39	10:08	11:39	13:09	14:42	16:09		17:10		18:05		18:47		19:37	20:52	21:57	23:48	0:11
Canton Ctr			8:43	10:12	11:43	13:13	14:46	16:13		17:14		18:09		18:51		19:41	20:56	22:01	23:52	0:15
Stoughton	6:52	7:17	8:49	10:18	11:49	13:19	14:52	16:19		17:21		18:16		18:58		19:48	21:02	22:07	23:58	0:21
N Easton	6:56	7:21	8:53	10:22	11:53	13:23	14:56	16:23	17:03	17:26	17:54	18:21	18:31	19:03	19:16	19:53	21:06	22:11	0:02	0:25
Easton Vil	6:59		8:57	10:26	11:57	13:27	15:00	16:27	17:07		17:58		18:35		19:20		21:09	22:14	0:06	0:28
Raynham	7:05	7:28	9:03	10:32	12:03	13:33	15:06	16:33	17:14		18:05		18:42		19:27		21:16	22:21	0:12	0:35
Taunton		7:34	9:09		12:09	13:39	15:12	16:39	17:21		18:12		18:49		19:34		21:22	22:27	0:18	0:41
Taunton Dep	7:14	7:39	9:14	10:41	12:14	13:44	15:17	16:44	17:26		18:17		18:54		19:39		21:27	22:32	0:23	0:46
King's Hwy			9:27		12:27		15:30		17:39		18:30		19:07		19:52		21:40		0:36	
Whale's Tooth	7:30		9:31		12:31		15:34		17:44		18:35		19:12		19:57		21:44		0:40	
Freetown		7:50		10:52		13:55		16:55		17:49		18:44		19:26		20:17		22:43		0:57
Fall River		7:58		10:59		14:02		17:02		17:56		18:51		19:33		20:24		22:50		1:04
Battleship Cv		8:01		11:01		14:04		17:04		17:59		18:54		19:36		20:27		22:52		1:06
Turn To	*908*	*948*	*910*	*950*	*912*	*952*	*914*	*954*	*Yard*	*Yard*	*916*	*Yard*	*Yard*	*956*	*Yard*	*958*	*918*	*Yard*	*Yard*	*Yard*

900-919	**New Bedford Service**
940-959	**Fall River Service**
Blue	Indicates L stop (regular stop, but train may leave ahead of schedule)
	Peak Period Trains
	Indicates trains not simulated as part of the PM Period Alternative 2 and Alternative 3 simulations

Schedule Taken From South Coast Rail FEIR Operations Analysis 2030 Proposed Weekday Operating Plan - Electric Service

Project # 12076.00

South Station Expansion Project - Operations Analysis
Middleborough Line - Proposed Future 2035 PM Schedule

December, 2015

Turn From	*Yard*	*Yard*	*Yard*	*Yard*	*003*	*005*	*007*	*009*	*015*	*017*	*019*	*027*
Northbound	002	004	006	008	010	012	014	016	018	020	022	028
Middleborough	5:20	6:00	6:58	7:20	8:07	9:38	11:10	13:08	15:25	16:54	18:05	21:25
Bridgewater	5:30	6:10	7:08	7:30	8:17	9:48	11:20	13:18	15:35	17:04	18:20	21:35
Campello	5:37	6:18	7:16	7:38	8:25	9:56	11:28	13:26	15:43	17:11	18:28	21:42
Brockton	5:41	6:22	7:20	7:42	8:29	10:00	11:32	13:30	15:47	17:15	18:33	21:46
Montello	5:44	6:25	7:23	7:45	8:32	10:03	11:35	13:33	15:50	17:18	18:37	21:49
Holbrook/Randolph	5:49	6:30	7:28	7:50	8:37	10:08	11:40	13:38	15:55	17:23	18:42	21:54
Braintree	5:56				8:44			13:44	16:03	17:31	20:48	22:00
Quincy Ctr		6:42	7:39	8:01		10:20	11:51	13:49				22:05
JFK/UMass	6:10		7:48	8:11	8:58							
S Stn	6:17	6:58	7:56	8:18	9:05	10:36	12:07	14:06	16:24	18:06	19:15	22:22
Turn To	*003*	*033*	*Yard*	*Yard*	*Yard*	*063*	*Yard*	*Yard*	*019*	*067*	*051*	*057*

Turn From	*002*	*036*	*040*	*080*	*Yard*	*064*	*018*	*Yard*	*Yard*	*088*	*052*	*056*
Southbound	003	005	007	009	015	017	019	021	023	025	027	029
S Stn	6:35	8:24	9:57	11:57	14:10	15:43	16:40	17:12	17:57	18:52	20:07	22:30
JFK/UMass						15:49			18:03		20:13	
Quincy Ctr	6:49		10:10	12:10	14:23	15:57	16:53	17:25	18:11	19:05	20:21	22:43
Braintree	6:55	8:43										
Holbrook/Randolph	7:03	8:51	10:22	12:23	14:36	16:10	17:06	17:37	18:23	19:17	20:34	22:56
Montello	7:08	8:56	10:27	12:28	14:41	16:15	17:11	17:42	18:28	19:22	20:39	23:01
Brockton	7:12	8:59	10:30	12:31	14:44	16:18	17:14	17:45	18:31	19:25	20:42	23:04
Campello	7:29	9:03	10:34	12:35	14:48	16:22	17:18	17:49	18:35	19:29	20:46	23:08
Bridgewater	7:38	9:11	10:42	12:43	14:56	16:30	17:26	17:57	18:43	19:37	20:54	23:16
Middleborough	7:50	9:23	10:53	12:55	15:10	16:41	17:38	18:10	18:55	19:50	21:05	23:27
Turn To	*010*	*012*	*014*	*016*	*018*	*020*	*022*	*Yard*	*Yard*	*Yard*	*028*	*Yard*

Blue	Indicates L stop (regular stop, but train may leave ahead of schedule)
Red	Indicates f stop (train will not stop unless passengers notify conductor they wish to get off or passengers are visible waiting on the platform)
	Indicates peak hour trains
	Indicates trains not simulated as part of the PM Period Alternative 2 and Alternative 3 simulations

Based on MBTA Middleborough Line Schedule Effective July 1, 2012
Equipment Turns Based on Proposed Future 2035 Eq Cycle

Turn From	*Yard*	*Yard*	*Yard*	*Yard*	*033*	*061*	*063*	*065*	*041*	*045*	*067*	*051*
Northbound	032	034	036	038	040	060	062	064	048	052	066	056
Kingston	5:32	6:19	7:11	7:37	8:37	10:05		13:35	16:02	18:27	19:23	20:53
Plymouth						10:48	12:06	14:28			19:45	
Halifax	5:42	6:29	7:21	7:47	8:47	10:58	12:16	14:38	16:12	18:40	19:55	21:03
Hanson	5:47	6:34	7:26	7:52	8:52	11:03	12:21	14:43	16:17	18:45	20:00	21:08
Whitman	5:52	6:39	7:31	7:57	8:57	11:08	12:26	14:48	16:22	18:55	20:08	21:13
Abington	5:56	6:43	7:35	8:01	9:01	11:12	12:30	14:52	16:26	18:58	20:12	21:17
S Weymouth	6:01	6:49	7:42	8:06	9:06	11:20	12:37	14:57	16:31	19:03	20:17	21:22
Braintree		6:57	7:50	8:14	9:14	11:27	12:45	15:05	16:38	19:11	20:25	21:29
Quincy Ctr												
JFK/UMass	6:21		8:03	8:28	9:27		12:58					
S Stn	6:29	7:17	8:10	8:35	9:34	11:46	13:05	15:26	16:59	19:28	20:45	21:49
Turn To	*Yard*	*Yard*	*005*	*061*	*007*	*Yard*	*Yard*	*017*	*085*	*027*	*055*	*029*

Turn From	*004*	*038*	*012*	*Yard*	*Yard*	*Yard*	*086*	*Yard*	*020*	*022*	*066*	*028*
Southbound	033	061	063	065	041	043	045	047	067	051	055	057
S Stn	7:11	8:56	10:50	12:25	14:47	16:20	17:00	17:38	18:15	19:29	21:30	22:40
JFK/UMass					14:53	16:26	17:06				21:36	22:46
Quincy Ctr		9:09						17:51				
Braintree	7:32	9:15	11:08	12:44	15:07	16:40	17:19	17:57	18:33	19:47	21:48	22:59
S Weymouth	7:39	9:22	11:15	12:51	15:14	16:47	17:26	18:04	18:40	19:54	21:55	23:06
Abington	7:44	9:27	11:20	12:57	15:19	16:52	17:31	18:09	18:45	19:59	22:00	23:11
Whitman	7:47	9:31	11:24	13:01	15:23	16:56	17:35	18:13	18:48	20:03	22:03	23:15
Hanson	7:57	9:36	11:29	13:06	15:28	17:01	17:40	18:18	18:53	20:08	22:08	23:20
Halifax	8:02	9:41	11:34	13:11	15:33	17:06	17:45	18:23	18:58	20:13	22:13	23:25
Kingston	8:12	9:53		13:23	15:45	17:18	17:57	18:35	19:11	20:26	22:26	23:36
Plymouth		10:23	11:47	13:52	0:00				19:37			
Turn To	*040*	*060*	*062*	*064*	*048*	*Yard*	*052*	*Yard*	*066*	*056*	*Yard*	*Yard*

Blue	Indicates L stop (regular stop, but train may leave ahead of schedule)
	Indicates peak hour trains
	Indicates trains not simulated as part of the PM Period Alternative 2 and Alternative 3 simulations

Based on MBTA Kingston Line Schedule Effective July 1, 2012
Equipment Turns Based on Proposed Future 2035 Eq Cycle

Turn From	*Yard*	*Yard*	*Yard*	*Yard*	*071*	*073*	*075*	*077*	*079*	*081*	*087*	*089*
Northbound	**70**	**72**	**74**	**76**	**78**	**80**	**82**	**84**	**86**	**88**	**90**	**92**
Greenbush	5:40	6:37	7:03	7:50	8:50	10:35	11:50	14:11	15:47	17:20	19:05	20:10
N Scituate	5:47	6:44	7:10	7:57	8:57	10:42	11:57	14:18	15:54	17:27	19:12	20:17
Cohasset	5:54	6:51	7:17	8:04	9:04	10:48	12:04	14:25	16:01	17:38	19:22	20:23
Nantasket Jct	5:58	6:55	7:21	8:08	9:08	10:51	12:08	14:28	16:04	17:42	19:26	20:26
W Hingham	6:03	7:00	7:26	8:13	9:13	10:56	12:13	14:33	16:09	17:47	19:31	20:31
E Weymouth	6:07	7:04	7:30	8:17	9:17	11:03	12:17	14:37	16:12	17:53	19:35	20:34
E Braintree	6:13	7:10	7:36	8:23	9:23	11:09	12:23	14:43	16:18	17:59	19:41	20:40
Quincy Ctr	6:22		7:46	8:32	9:32	11:18	12:32	14:52	16:28		19:53	20:49
JFK/UMass	6:30	7:28										
S Stn	6:38	7:36	8:03	8:49	9:49	11:34	12:48	15:09	16:46	18:34	20:07	21:07
Turn To	*071*	*Yard*	*Yard*	*073*	*075*	*009*	*Yard*	*081*	*045*	*025*	*091*	*093*

Turn From	*070*	*076*	*078*	*Yard*	*Yard*	*084*	*Yard*	*048*	*Yard*	*Yard*	*090*	*092*
Southbound	**71**	**73**	**75**	**77**	**79**	**81**	**83**	**85**	**87**	**89**	**91**	**93**
S Stn	6:54	9:25	10:30	12:41	14:27	16:02	16:52	17:20	17:45	18:38	20:25	22:00
JFK/UMass						16:08		17:26				
Quincy Ctr		8:38	10:43	12:54	14:40		17:05		17:58	18:51	20:38	22:13
E Braintree	7:17	9:47	10:52	13:03	14:49	16:24	17:14	17:42	18:07	19:00	20:47	22:22
E Weymouth	7:23	9:53	10:58	13:08	14:55	16:30	17:20	17:48	18:13	19:06	20:53	22:28
W Hingham	7:30	9:57	11:03	13:12	14:59	16:34	17:24	17:52	18:17	19:10	20:56	22:32
Nantasket Jct	7:34	10:02	11:07	13:17	14:04	16:39	17:29	17:57	18:22	19:15	21:00	22:37
Cohasset	7:37	10:05	11:10	13:20	15:08	16:43	17:33	18:00	18:25	19:19	21:03	22:40
N Scituate	7:45	10:13	11:18	13:28	15:16	16:51	17:41	18:08	18:33	19:27	21:12	22:48
Greenbush	7:55	10:23	11:28	13:39	15:25	16:59	17:51	18:18	18:43	19:36	21:22	22:57
Turn To	*078*	*080*	*082*	*084*	*086*	*088*	*Yard*	*Yard*	*090*	*092*	*Yard*	*Yard*

Blue	Indicates L stop (regular stop, but train may leave ahead of schedule)
	Indicates peak hour trains
	Indicates trains not simulated as part of the PM Period Alternative 2 and Alternative 3 simulations

Based on MBTA Greenbush Line Schedule Effective July 1, 2012
Equipment Turns Based on Proposed Future 2035 Eq Cycle

Inbound	5500	66	5502	5504	3190	3192	140	190	3150	5506	3152	170	5508	3154	142	3156	172	3158	5512	3160	86	5514	3162	174	5516	3164	5518	144	3166	176	5520	3168	448	5522	3170	94	146	3172	5524	178
Lv Springfield	5:59		6:53	8:00			9:05			10:10			11:10		12:30				14:10			15:30			16:36		17:10	17:34			18:10		17:53	19:25				19:53		21:00	
Lv Worcester	6:57		7:51	8:58			10:03			11:08			12:08		13:28				15:08			16:28			17:34		18:08	18:32			19:08		18:57	20:23				20:51		21:58	
Ar Providence		6:32			9:02	9:43		10:27	10:43		11:43	12:02		12:43		13:43	14:02	14:43		15:43	15:52		16:47	17:12		17:43			18:43	19:02		19:38			20:43	20:42		21:43		23:17
Lv Providence		6:53			9:03	9:45		10:29	10:45		11:45	12:04		12:45		13:45	14:04	14:45		15:45	15:54		16:49	17:14		17:45			18:45	19:04		19:40			20:45	20:51		21:45		23:19
Lv Route 128		7:31			9:37	10:19		11:00	11:19		12:19	12:35		13:19		14:19	14:35	15:19		16:19	16:25		17:23	17:45		18:19			19:19	19:35		20:14			21:19	21:25		22:19		23:49
Lv Back Bay	7:47	7:50	8:41	9:48	9:51	10:29	10:53	11:11	11:29	11:58	12:29	12:46	12:58	13:29	14:18	14:29	14:46	15:29	15:58	16:29	16:36	17:18	17:33	17:56	18:24	18:29	18:58	19:22	19:29	19:46	19:58	20:24	21:04	21:13	21:29	21:36	21:41	22:29	22:48	23:58
Ar South Station	7:52	7:55	8:46	9:53	9:56	10:35	10:58	11:16	11:35	12:03	12:35	12:51	13:03	13:35	14:23	14:35	14:51	15:35	16:03	16:35	16:41	17:23	17:39	18:01	18:29	18:35	19:03	19:27	19:35	19:51	20:03	20:30	21:10	21:18	21:35	21:44	21:46	22:35	22:53	0:03
Turn To	*5507*	*Yard*	*5513*	*5517*	*3165*	*Yard*	*Yard*	*Yard*	*Yard*	*5519*	*Yard*	*Yard*	*Yard*	*3173*	*Yard*	*Yard*	*Yard*	*3197*	*5525*	*Yard*	*Yard*	*5527*	*Yard*	*Yard*	*Yard*	*Yard*	*5531*	*Yard*	*Yard*	*Yard*	*5533*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*
Next Trip	*5507*	*67*	*5513*	*5517*	*3165*	*3167*	*147*	*175*	*3169*	*5519*	*3171*	*177*	*5521*	*3173*	*149*	*3175*	*179*	*3197*	*5525*	*3159*	*95*	*5527*	*3161*	*171*	*5501*	*3163*	*5531*	*143*	*3151*	*173*	*5533*	*3153*	*449*	*5503*	*3155*	*93*	*145*	*3157*	*5505*	*137*

Previous Trip	*3166*	*5516*	*3168*	*86*	*144*	*5522*	*3170*	*3172*	*174*	*5524*	*5500*	*3160*	*94*	*3162*	*146*	*3164*	*5502*	*448*	*176*	*3190*	*3192*	*5504*	*178*	*3150*	*5506*	*5508*	*3152*	*190*	*140*	*3154*	*5512*	*3156*	*170*	*5514*	*3158*	*142*	*172*	*5518*	*5520*	*66*
Turns From	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*5500*	*Yard*	*Yard*	*Yard*	*Yard*	*Yard*	*5502*	*Yard*	*Yard*	*3190*	*Yard*	*5504*	*Yard*	*Yard*	*5506*	*Yard*	*Yard*	*Yard*	*Yard*	*3154*	*5512*	*Yard*	*Yard*	*5514*	*3158*	*Yard*	*Yard*	*5518*	*5520*	*Yard*
Outbound	3151	5501	3153	95	143	5503	3155	3157	171	5505	5507	3159	93	3161	145	3163	5513	449	173	3165	3167	5517	137	3169	5519	5521	3171	175	147	3173	5525	3175	177	5527	3197	149	179	5531	5533	67
Lv South Station	5:10	5:30	6:05	6:10	6:10	7:10	7:15	8:05	8:10	8:15	9:10	9:15	9:30	9:56	10:15	11:10	11:10	11:55	12:00	12:10	13:10	13:10	13:30	14:10	14:10	15:10	15:10	15:35	15:50	16:00	17:10	17:15	17:37	18:10	18:10	19:10	19:11	20:10	21:10	21:28
Lv Back Bay	5:15	5:35	6:10	6:15	6:15	7:15	7:20	8:10	8:15	8:20	9:15	9:20	9:35	10:01	10:20	11:15	11:15	12:00	12:05	12:15	13:15	13:15	13:35	14:15	14:15	15:15	15:15	15:40	15:55	16:05	17:15	17:20	17:42	18:15	18:15	19:15	19:16	20:15	21:15	21:34
Lv Route 128	5:24		6:19	6:25			7:29	8:19	8:25			9:29	9:45	10:10		11:24			12:15	12:24	13:24		13:45	14:24			15:24	15:50		16:14		17:29	17:52		18:24		19:26			21:48
Ar Providence	5:44		6:39	6:48			7:49	8:39	8:48			9:49	10:08	10:30		11:44			12:38	12:44	13:44		14:08	14:44			15:44	16:13		16:34		17:49	18:15		18:44		19:51			22:13
Lv Providence	5:45		6:40	6:59			7:50	8:40	8:50			9:50	10:10	10:31		11:45			12:48	12:45	13:45		14:10	14:45			15:45	16:16		16:35		17:50	18:17		18:45		19:53			22:20
Lv Worcester		6:25			7:05	8:05				9:10	10:05				11:10		12:05	12:50					14:05			15:05	16:05			16:45		18:05			19:05		20:05		21:05	22:05	
Lv Springfield		7:23			8:03	9:03				10:08	11:03				12:08		13:03	13:48					15:03			16:03	17:03			17:43		19:03			20:03		21:03		22:03	23:03	

Blue	Blue times indicate stops only to receive passengers and may leave early. (Float in RTC)
	Indicates Peak Period Trains
XXX	Indicates Amtrak High Speed Train
XXX	Indicates Amtrak Regional Train
XX	Indicates Amtrak Long Distance Train
XX	Indicates New England Regional Train (Inland Route)
	Indicates trains not simulated as part of the PM Period Alternative 2 and Alternative 3 simulations

Notes

Amtrak and New England Regional Intercity Service Weekday Schedules taken from the Amtrak Northeast Corridor Intercity Service Alternative: "B-Low 2020 - 2040" Operating Plan

Train Turn Parameters from the Amtrak Operating Plan include notes that 90 minute train turns in Boston are to occur at the platform and 120 minute turns will include a trip to Southampton Yard.

Worcester

NB	Previous Arrival Time	New Arrival Time	Δ Time	Earlier / Later	Notes:	SB	Previous Departure Time	New Departure Time	Δ Time	Earlier / Later	Notes:
504	7:36	7:21	0:15	Earlier		507	7:45	7:38	0:07	Earlier	
582	7:43	7:33	0:10	Earlier		515	13:15	13:20	0:05	Later	
506	8:16	8:26	0:10	Later		525	17:10	17:15	0:05	Later	
508	8:28	8:38	0:10	Later		583	17:35	17:33	0:02	Earlier	
516	10:00	10:05	0:05	Later		527	17:40	17:45	0:05	Later	
526	18:31	18:21	0:10	Earlier		529	17:55	18:00	0:05	Later	
						533	19:18	19:30	0:12	Later	
						535	20:35	20:30	0:05	Earlier	

Needham

NB	Previous Arrival Time	New Arrival Time	Δ Time	Earlier / Later	Notes:	SB	Previous Departure Time	New Departure Time	Δ Time	Earlier / Later	Notes:
600	6:50	6:51	0:01	Later	Travel Time Adjusted	609	8:40	8:45	0:05	Later	
602	7:29	7:31	0:02	Later		611	10:00	10:05	0:05	Later	
606	8:42	8:44	0:02	Later		613	12:00	11:49	0:11	Earlier	
608	9:13	9:18	0:05	Later		619	16:00	15:59	0:01	Earlier	Travel Time Adjusted
610	10:16	10:17	0:01	Later	Travel Time Adjusted	621	16:40	16:42	0:02	Later	
618	16:27	16:25	0:02	Earlier		623	-	-	-	-	Ruggles stop removed
620	17:42	17:51	0:09	Later	Travel Time Adjusted	625	17:55	18:01	0:06	Later	
622	18:17	18:26	0:09	Later		627	18:25	18:36	0:11	Later	Travel Time Adjusted
626	20:01	20:09	0:08	Later		629	19:10	19:12	0:02	Later	Travel Time Adjusted
628	20:36	20:50	0:14	Later		631	20:10	20:20	0:10	Later	Travel Time Adjusted
630	21:38	21:53	0:15	Later							

Franklin

NB	Previous Arrival Time	New Arrival Time	Δ Time	Earlier / Later	Notes:	SB	Previous Departure Time	New Departure Time	Δ Time	Earlier / Later	Notes:
702	-	-	-	-	Ruggles stop added	705	7:55	7:57	0:02	Later	
704	7:09	7:08	0:01	Earlier		793	-	-	-	-	Trip removed, supplemented by Fairmount Service
708	7:59	8:01	0:02	Later		707	9:25	9:24	0:01	Earlier	
732	8:40	8:41	0:01	Later	Ruggles stop added	715	15:55	16:06	0:11	Later	
710	8:54	8:57	0:03	Later		717	16:20	16:21	0:01	Later	
734	9:25	9:29	0:04	Later	Ruggles stop added, Travel Time Adjusted	737	16:45	16:39	0:06	Earlier	Franklin via Fairmount
718	15:05	15:09	0:04	Later	Ruggles stop added, Travel Time Adjusted	721	17:40	17:52	0:12	Later	
720	17:08	17:09	0:01	Later		723	18:15	18:25	0:10	Later	
736	-	-	-	-	Franklin via Fairmount	727	20:50	21:00	0:10	Later	
7796	18:50	18:55	0:05	Later	Travel Time Adjusted	729	22:35	22:37	0:02	Later	

Providence

NB	Previous Arrival Time	New Arrival Time	Δ Time	Earlier / Later		SB	Previous Departure Time	New Departure Time	Δ Time	Earlier / Later	
800	6:20	6:19	0:01	Earlier		843	7:50	7:51	0:01	Later	
802	6:40	6:39	0:01	Earlier		805	9:55	10:00	0:05	Later	
804	7:19	7:04	0:15	Earlier		811	15:30	15:35	0:05	Later	
806	7:45	7:44	0:01	Earlier	Ruggles stop added	813	16:00	16:10	0:10	Later	
842	8:07	8:10	0:03	Later	Ruggles stop added, Travel Time Adjusted	815	16:35	16:37	0:02	Later	
808	8:16	8:25	0:09	Later	Ruggles stop added, Travel Time Adjusted	819	17:40	17:45	0:05	Later	
810	8:51	8:53	0:02	Later	Ruggles stop added, Travel Time Adjusted	821	18:10	18:14	0:04	Later	
812	9:32	9:24	0:08	Earlier		825	20:15	20:12	0:03	Earlier	
844	9:49	9:42	0:07	Earlier		829	22:25	22:24	0:01	Earlier	
814	10:57	10:54	0:03	Earlier	Travel Time Adjusted						
820	-	-	-	-	Ruggles Stop Added						
822	18:22	18:18	0:04	Earlier							
826	20:34	20:41	0:07	Later							
828	21:25	21:28	0:03	Later							

Amtrak Acela

NB	Previous Arrival Time	New Arrival Time	Δ Time	Earlier / Later		SB	Previous Departure Time	New Departure Time	Δ Time	Earlier / Later	
3190	9:51	9:56	0:05	Later		3153	6:10	6:05	0:05	Earlier	
3162	17:35	17:39	0:04	Later		3155	7:10	7:15	0:05	Later	
3168	20:35	20:30	0:05	Earlier		3157	8:10	8:05	0:05	Earlier	
						3159	9:10	9:15	0:05	Later	
						3161	10:10	9:56	0:14	Earlier	
						3173	16:10	16:00	0:10	Earlier	
						3175	17:20	17:15	0:05	Earlier	
						3197	18:20	18:10	0:10	Earlier	

Amtrak Regional

NB	Previous Arrival Time	New Arrival Time	Δ Time	Earlier / Later		SB	Previous Departure Time	New Departure Time	Δ Time	Earlier / Later	
66	8:00	7:55	0:05	Earlier		95	6:05	6:10	0:05	Later	
174	17:51	18:01	0:10	Later		145	10:10	10:15	0:05	Later	
176	19:49	19:51	0:02	Later		147	15:55	15:50	0:05	Earlier	
94	21:43	21:44	0:01	Later		177	17:40	17:37	0:03	Earlier	
						179	19:15	19:11	0:04	Earlier	
						67	21:30	21:28	0:02	Earlier	

MassDOT New England Regional

NB	Previous Arrival Time	New Arrival Time	Δ Time	Earlier / Later		SB	Previous Departure Time	New Departure Time	Δ Time	Earlier / Later	
5500	7:53	7:52	0:01	Earlier		5505	8:10	8:15	0:05	Later	
5502	8:53	8:46	0:07	Earlier							
5516	18:23	18:29	0:06	Later							

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Attachment C – Future 2035 PM Peak Period Stringline Charts

Alternative 2 PM Peak Period Stringline Charts
Alternative 3 PM Peak Period Stringline Charts

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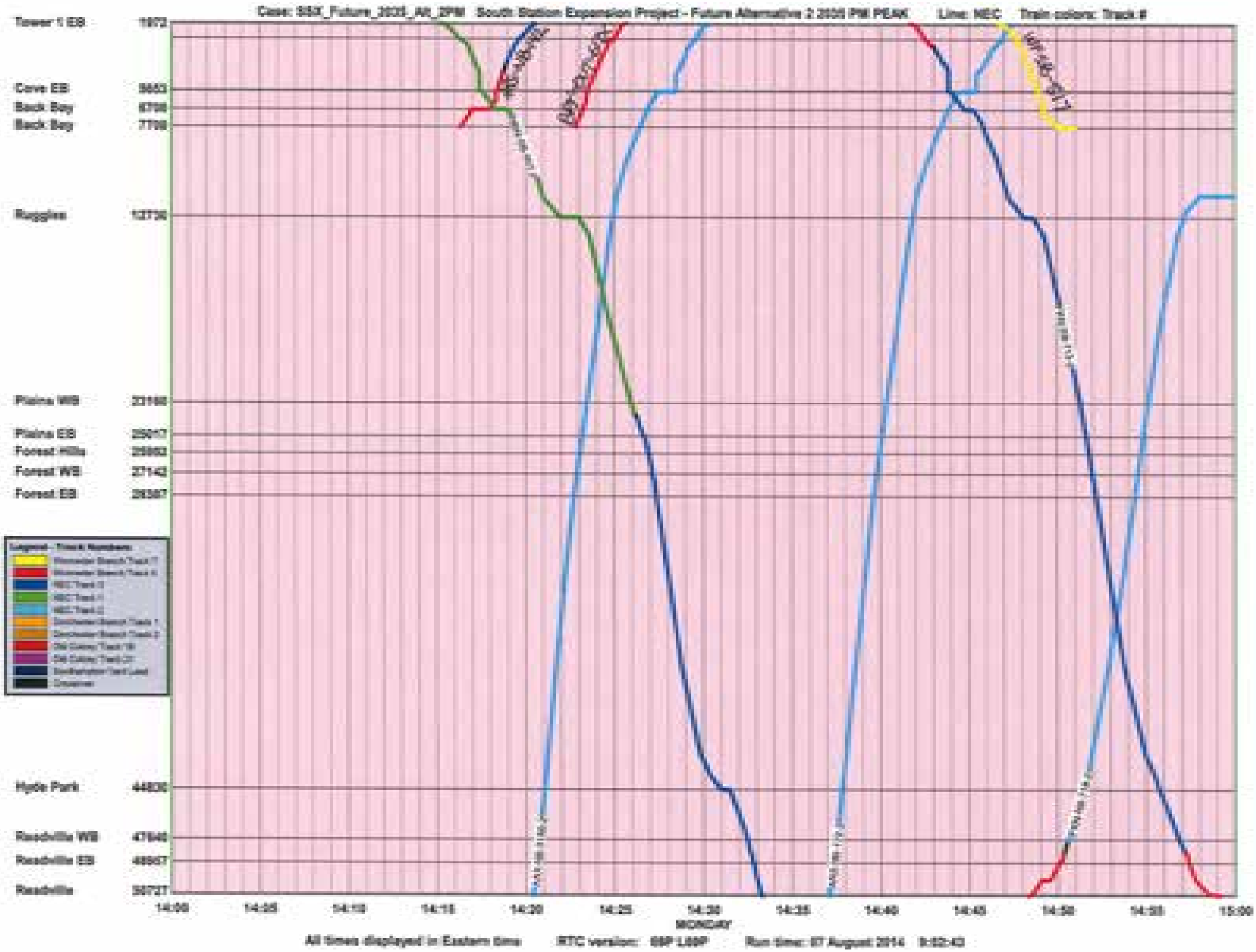
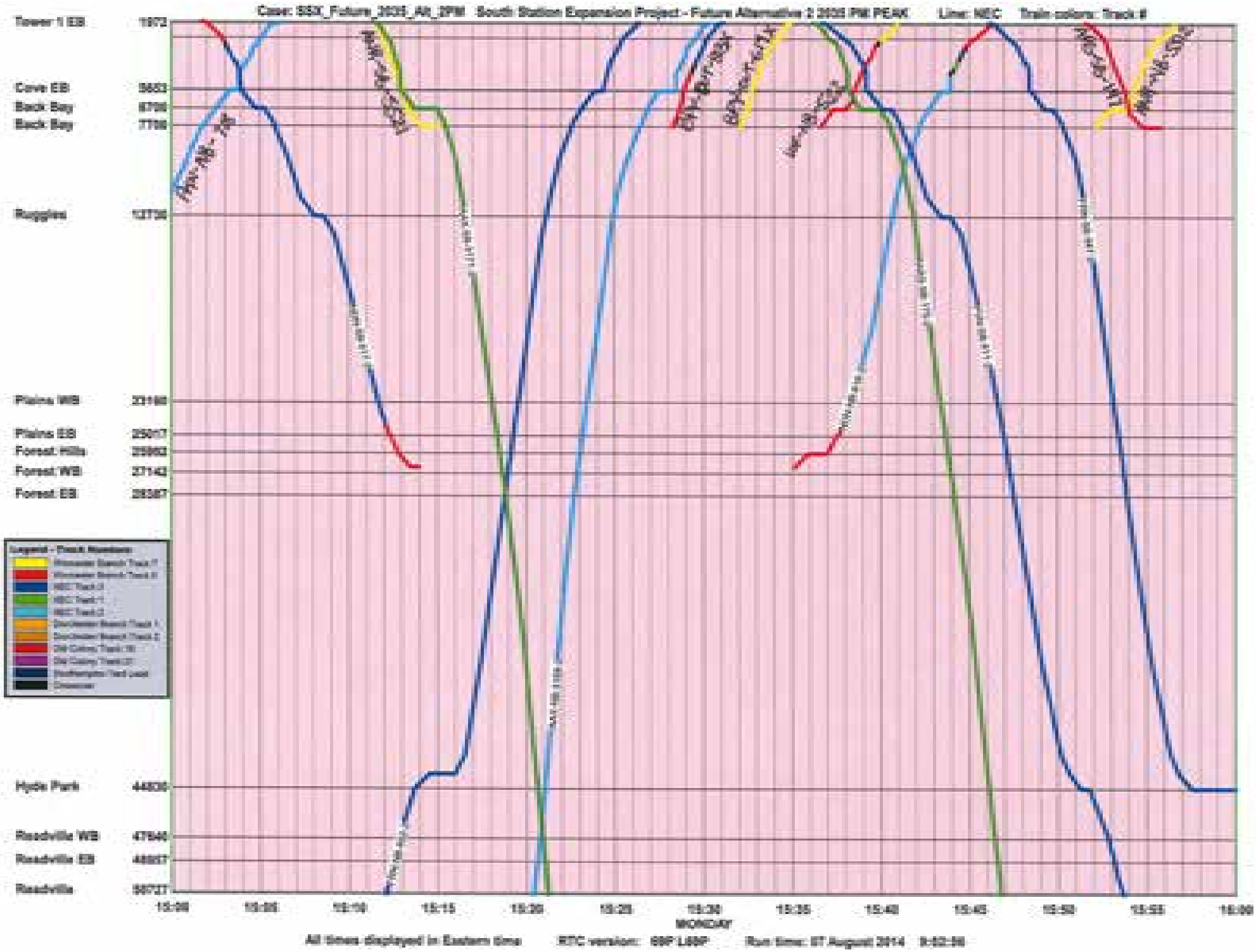
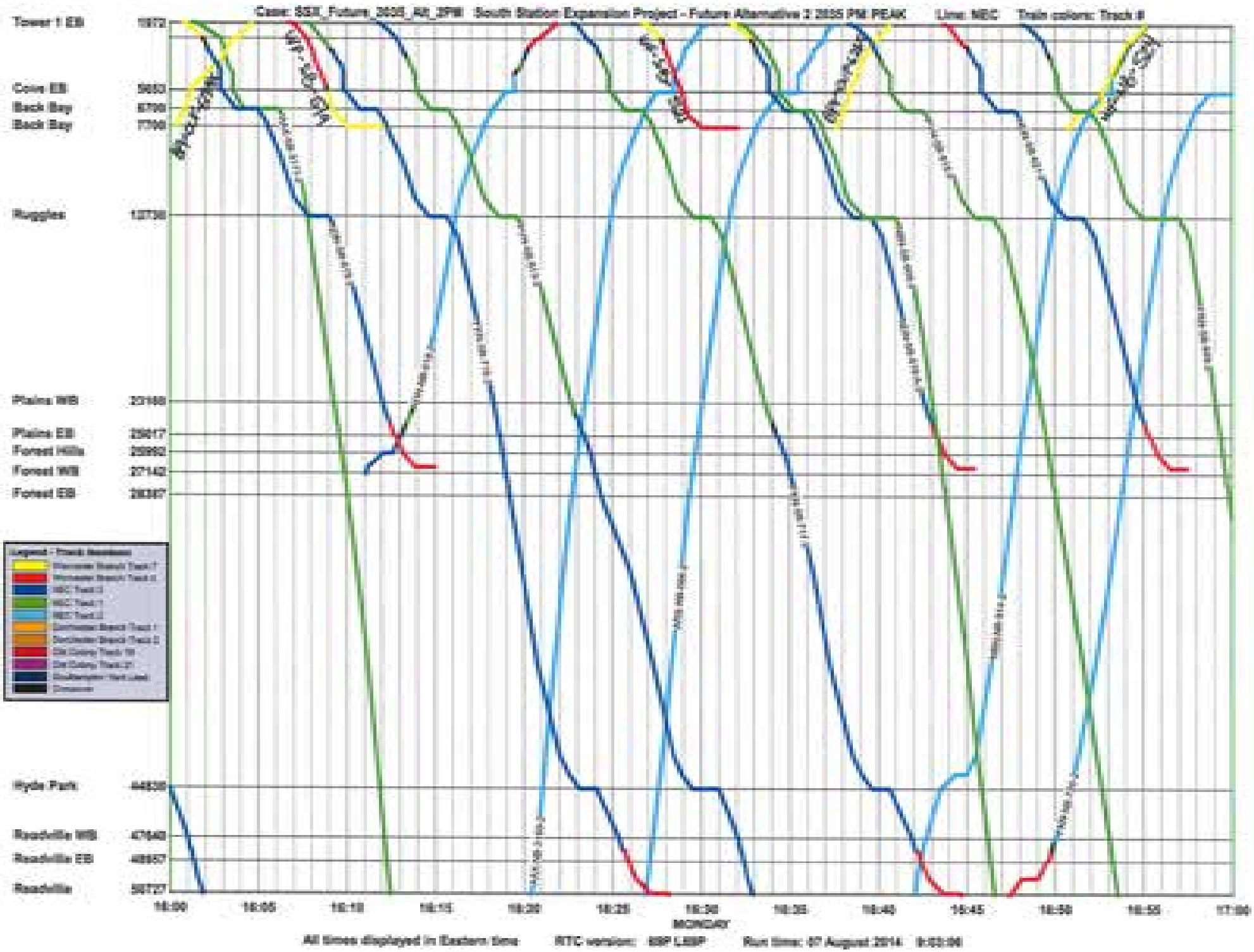
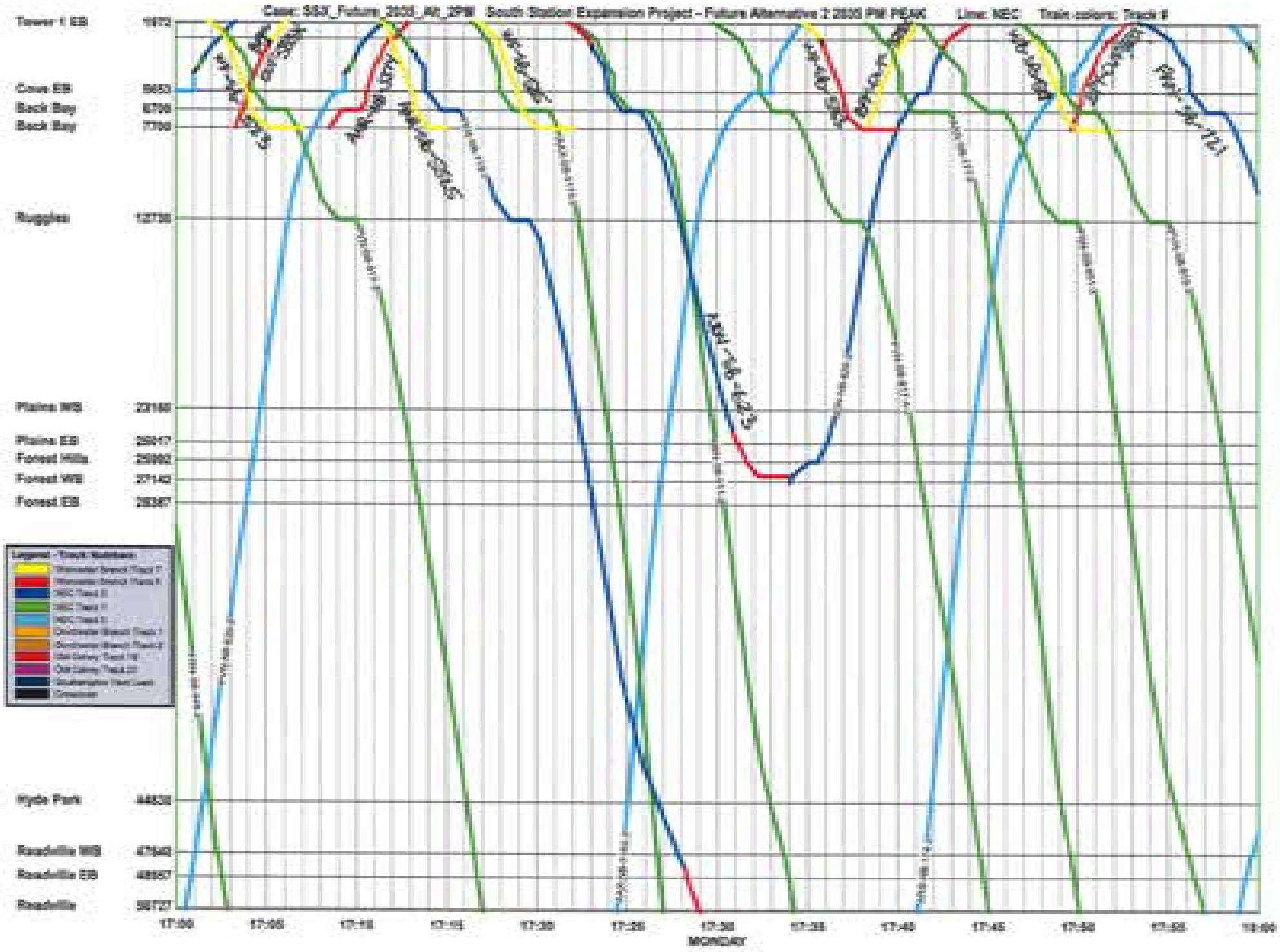
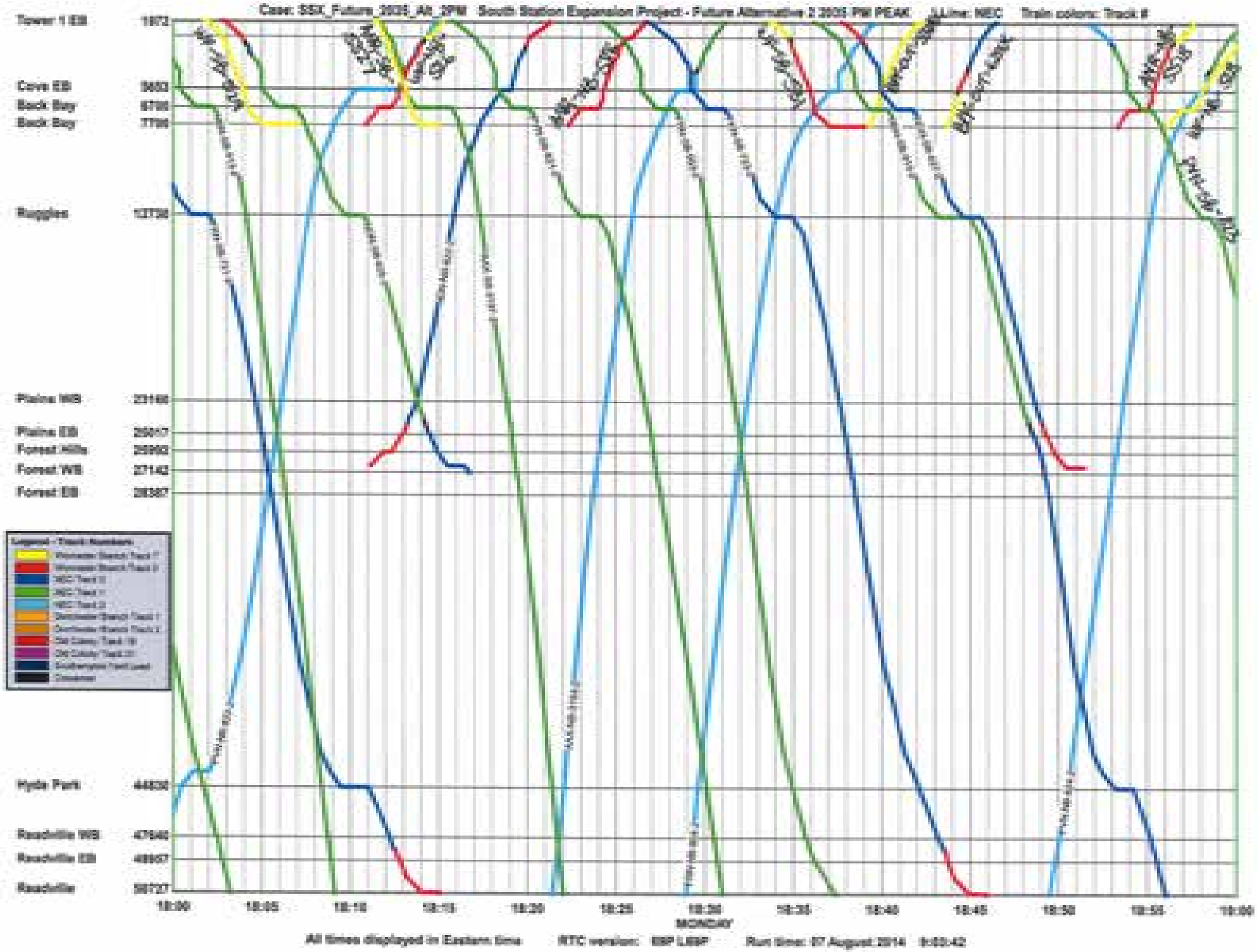
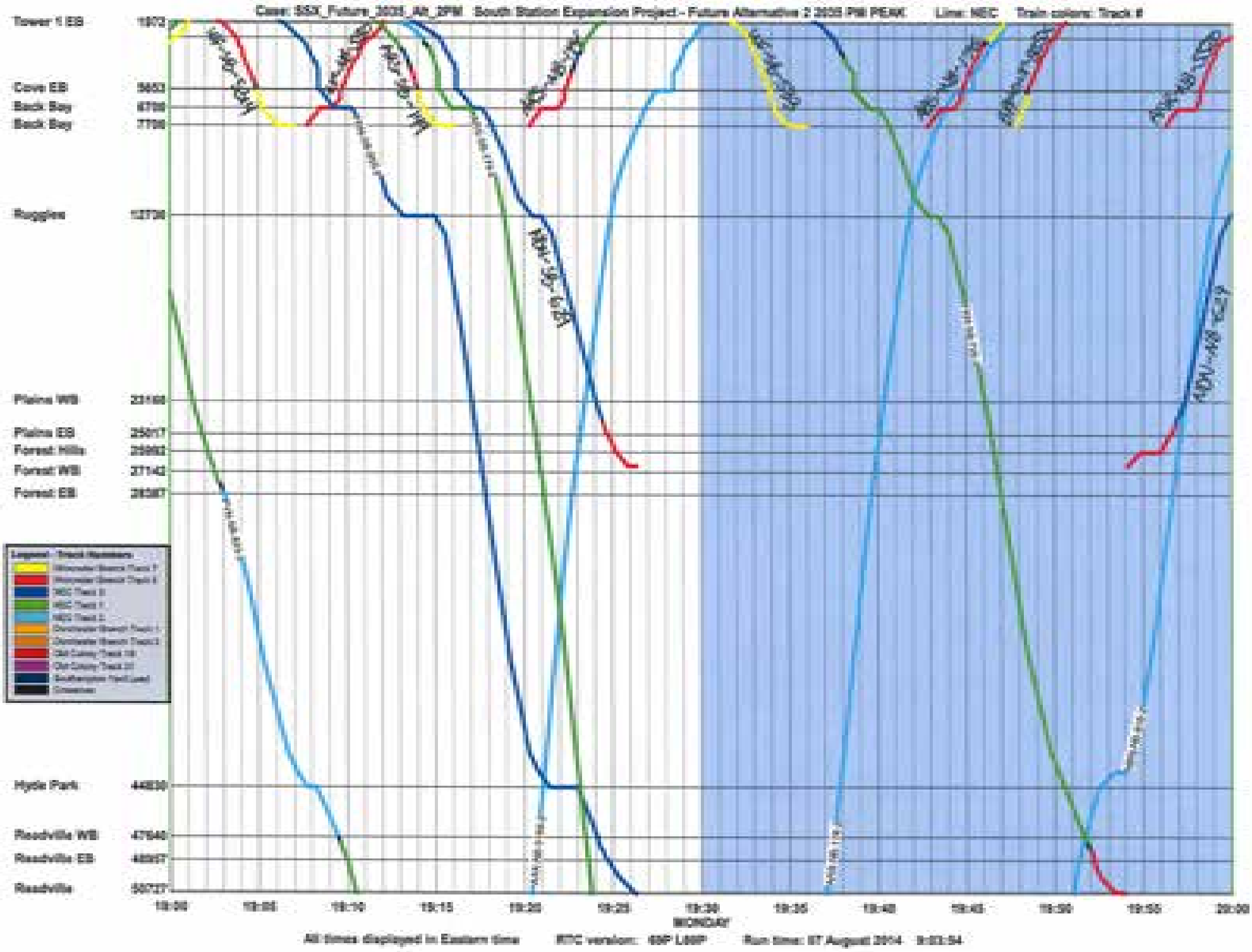

Case: SSX_Future_2035_Alt_2PM South Station Expansion Project - Future Alternative 2 2035 PM PEAK
Line: NEC
Train colors: Track #
Tower 1 EB
Cove EB
Back Bay
Back Bay
Ruggles
Platna WB
Platna EB
Forest Hills
Forest WB
Forest EB
Hyde Park
Readville WB
Readville EB
Readville
14:00
14:05
14:10
14:15
14:20
14:25
14:30
14:35
14:40
14:45
14:50
14:55
15:00
MONDAY
All times displayed in Eastern time
RTC version: 6SP LSSP
Run time: 07 August 2014 9:52:43


Case: SSX_Future_2035_Alt_2PM South Station Expansion Project - Future Alternative 2 2035 PM PEAK
Line: NEC
Train colors: Track #
Tower 1 EB
Cove EB
Back Bay
Back Bay
Ruggles
Plains WB
Plains EB
Forest Hills
Forest WB
Forest EB
Hyde Park
Readville WB
Readville EB
Readville
15:00
15:05
15:10
15:15
15:20
15:25
15:30
MONDAY
15:35
15:40
15:45
15:50
15:55
16:00
All times displayed in Eastern time
RTC version: 69P L69P
Run time: 07 August 2014


Case: SSX_Future_2035_Alt_2PM South Station Expansion Project - Future Alternative 2 2035 PM PEAK Line: NEC Train colors: Track #
Tower 1 EB
Cove EB
Back Bay
Back Bay
Ruggles
Plains WB
Plains EB
Forest Hills
Forest WB
Forest EB
Hyde Park
Readville WB
Readville EB
Readville
16:00
16:05
16:10
16:15
16:20
16:25
16:30
16:35
16:40
16:45
16:50
16:55
17:00
MONDAY
All times displayed in Eastern time
RTC version: 6SP LSSP
Run time: 07 August 2014


Case: SSX_Future_2035_Alt_2PM South Station Expansion Project - Future Alternative 2 2035 PM PEAK Line: NEC Train colors: Track #
Tower 1 EB
Cove EB
Back Bay
Back Bay
Ruggles
Plains WB
Plains EB
Forest Hills
Forest WB
Forest EB
Hyde Park
Readville WB
Readville EB
Readville
17:00
17:05
17:10
17:15
17:20
17:25
17:30
17:35
17:40
17:45
17:50
17:55
18:00
MONDAY
All times displayed in Eastern time
RTC version: 6SP LSSP
Run time: 07 August 2014


Case: SSX_Future_2035_Alt_2PM South Station Expansion Project - Future Alternative 2 2035 PM PEAK 1 Line: NEC Train colors: Track #
Tower 1 EB
Cove EB
Back Bay
Back Bay
Ruggles
Plains WB
Plains EB
Forest Hills
Forest WB
Forest EB
Hyde Park
Readville WB
Readville EB
Readville
18:00
18:05
18:10
18:15
18:20
18:25
18:30
18:35
18:40
18:45
18:50
18:55
19:00
MONDAY
All times displayed in Eastern time
RTC version: ESP LSSP
Run time: 07 August 2014 9:03:42


Case: SSX_Future_2035_A6_2PM South Station Expansion Project - Future Alternative 2 2035 PM PEAK Line: NEC Train colors: Track #
Tower 1 EB
Cove EB
Back Bay
Back Bay
Ruggles
Plaina WB
Plaina EB
Forest Hills
Forest WB
Forest EB
Hyde Park
Readville WB
Readville EB
Readville
19:00
19:05
19:10
19:15
19:20
19:25
19:30
MONDAY
19:35
19:40
19:45
19:50
19:55
20:00
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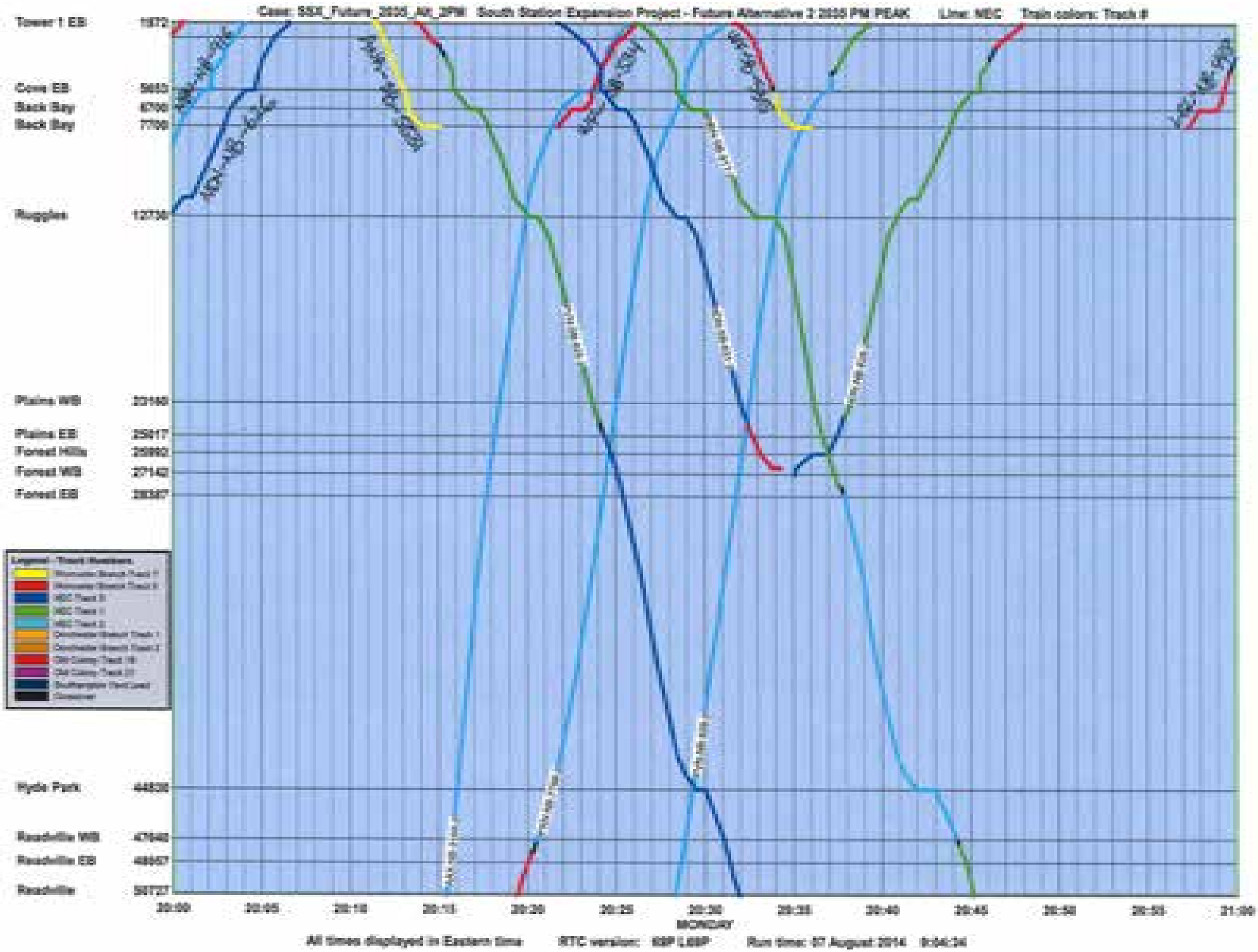
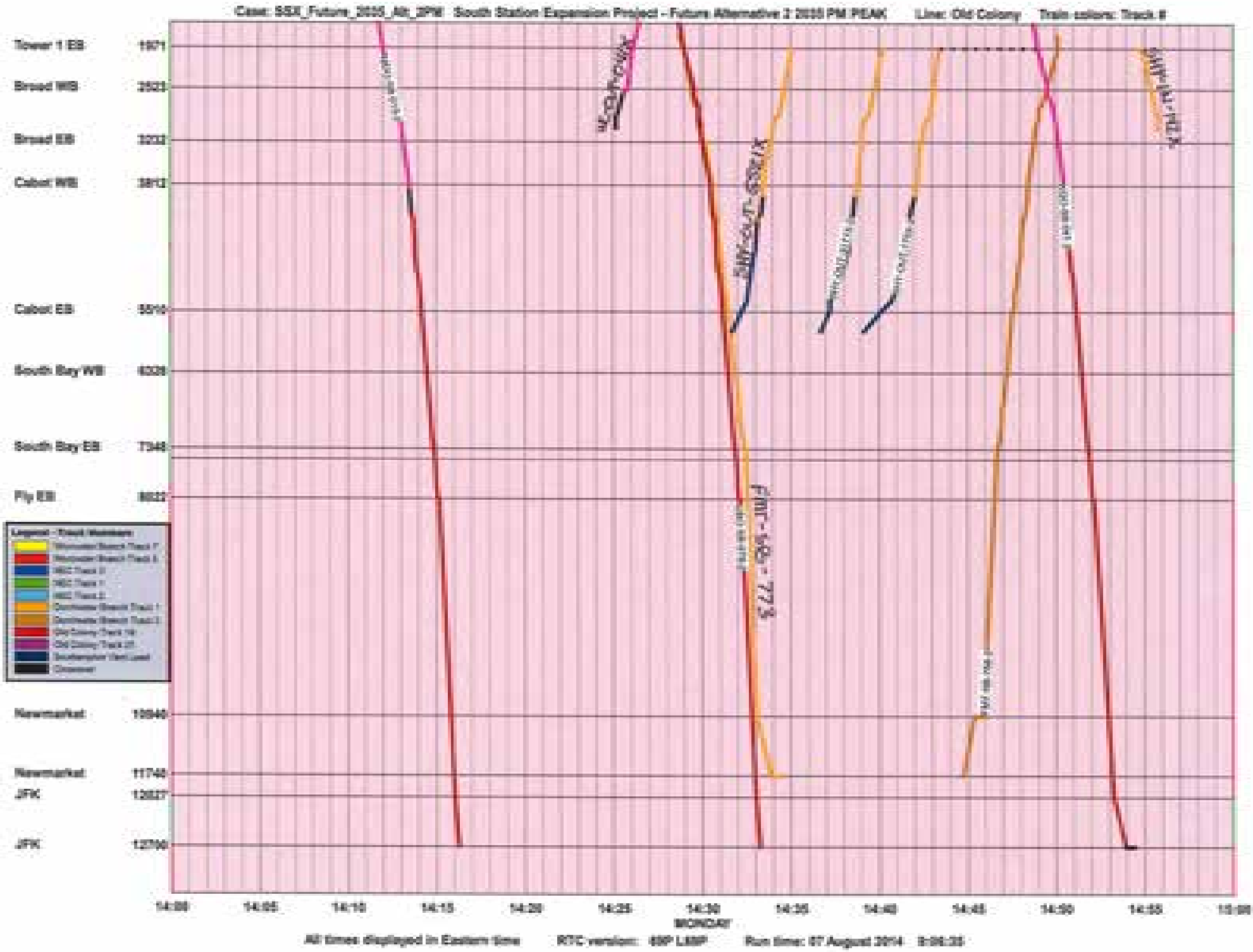
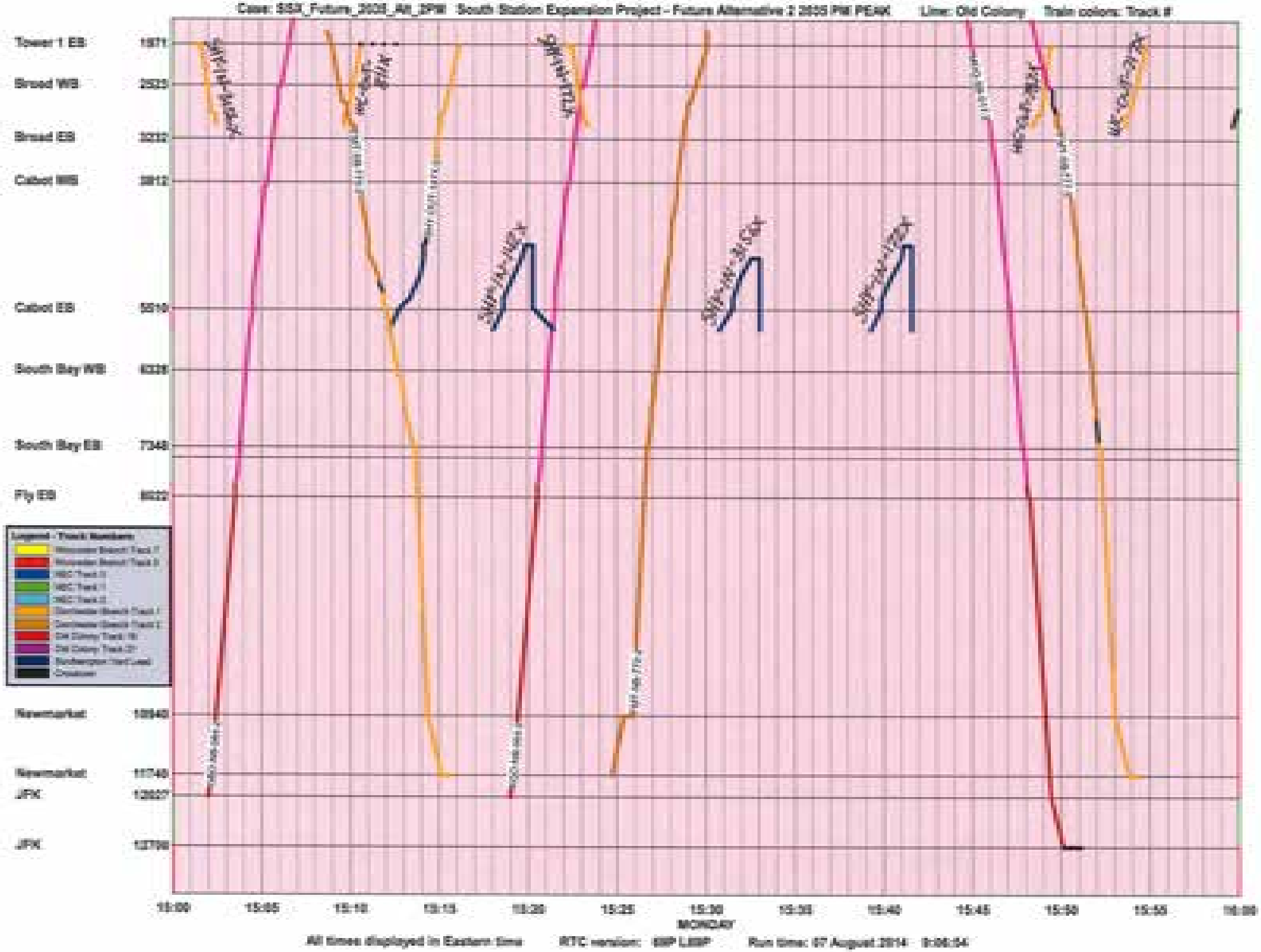
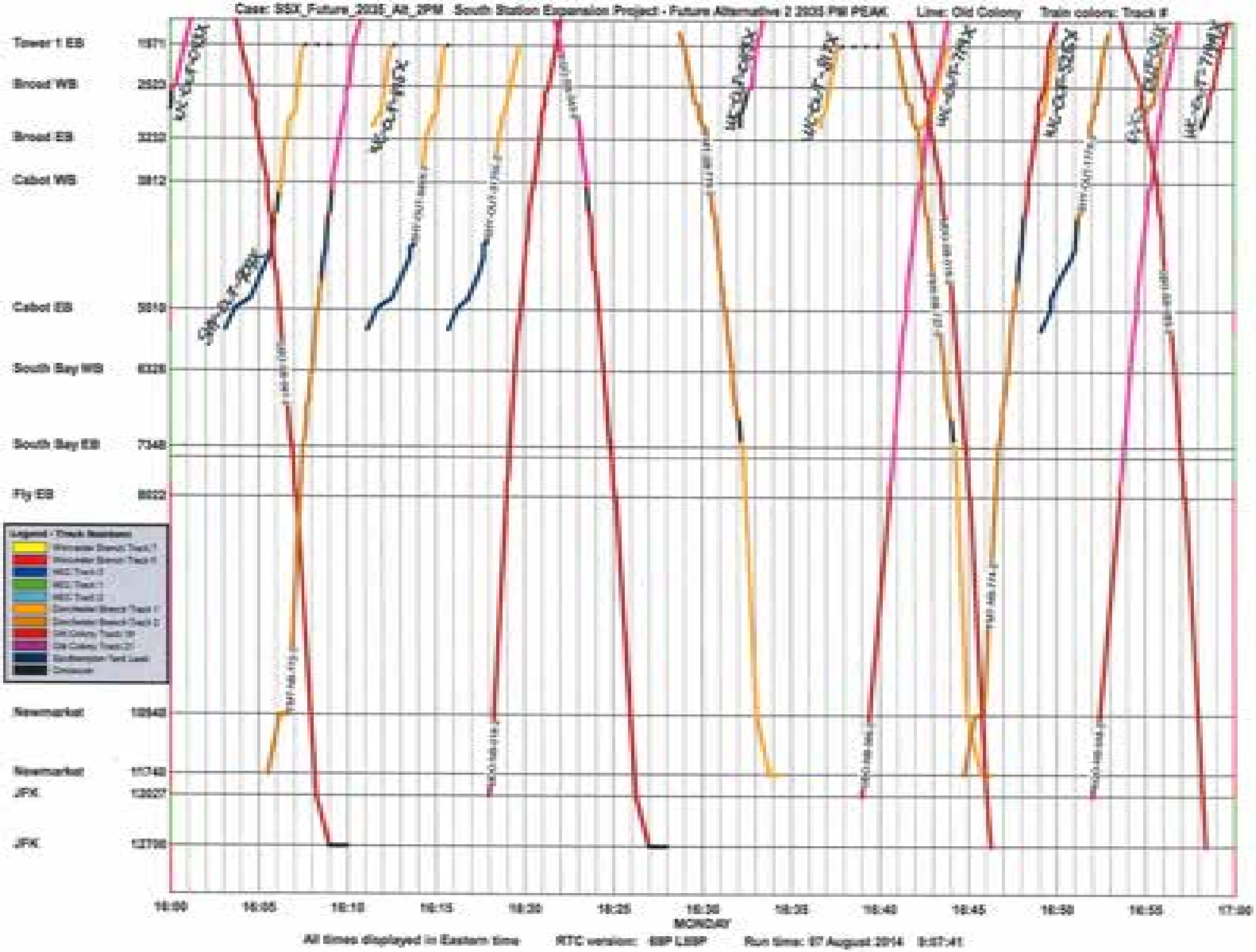
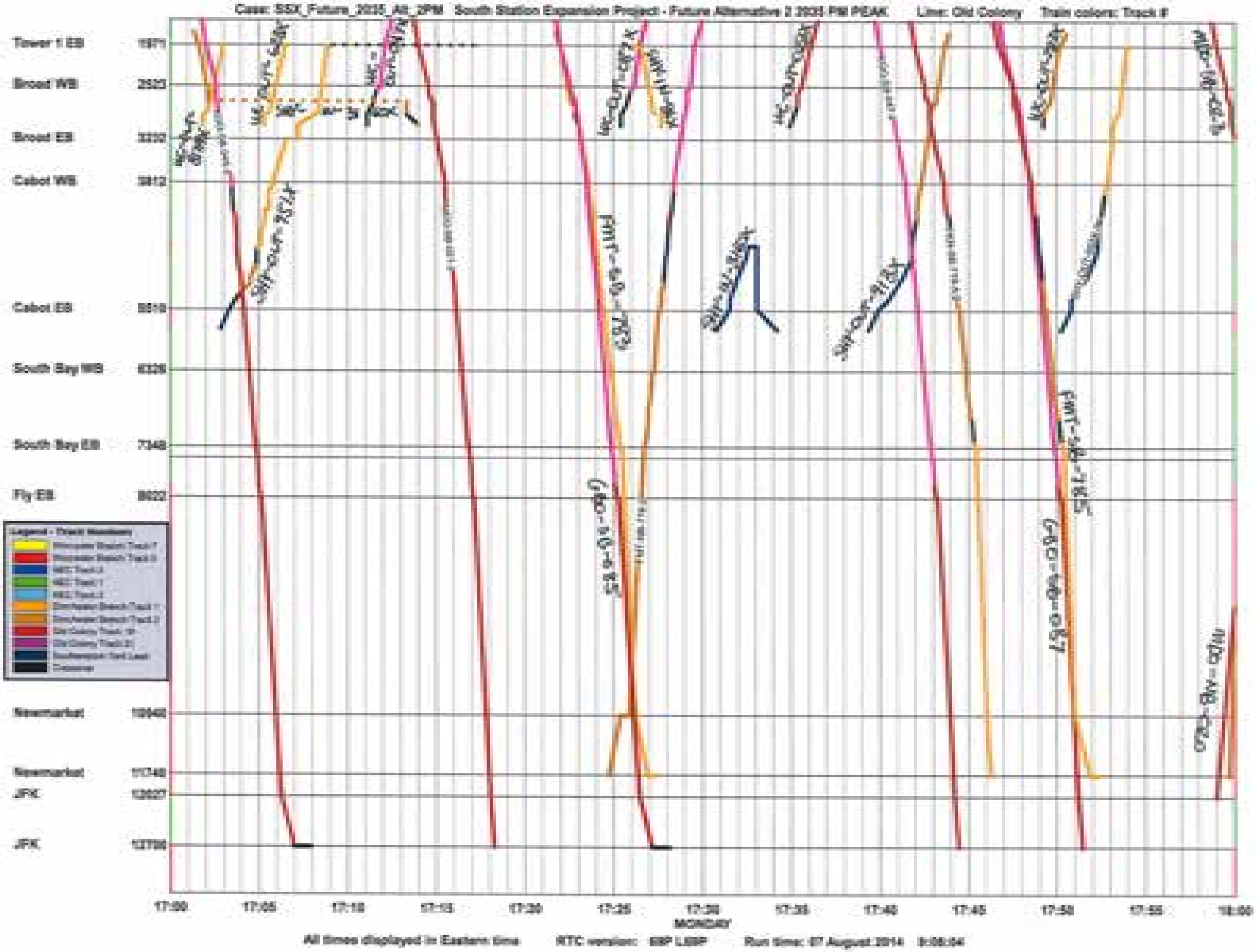
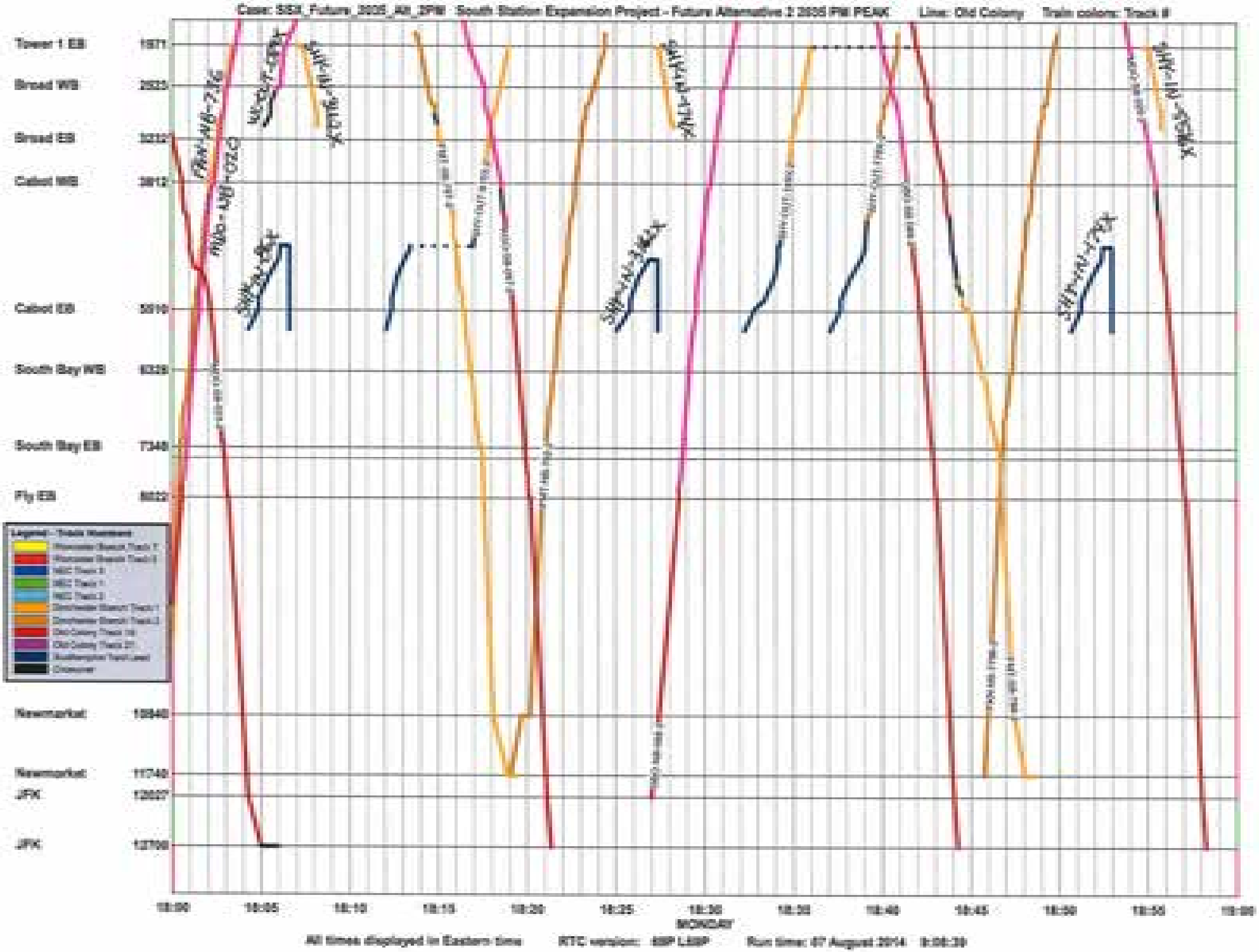

Case: SSX_Future_2035_Alt_3PM South Station Expansion Project - Future Alternative 3 2035 PM PEAK
Line: NEC
Train colors: Track #
Tower 1 EB
1872
Cove EB
Back Bay
Back Bay
Ruggles
12730
Plains WB
Plains EB
25817
Forest Hills
Forest WB
27142
Forest EB
Hyde Park
44838
Readville WB
47640
Readville EB
48557
Readville
50727
MONDAY
All times displayed in Eastern time
RTC version: 63P L63P
Run time: 07 August 2014 9:04:24

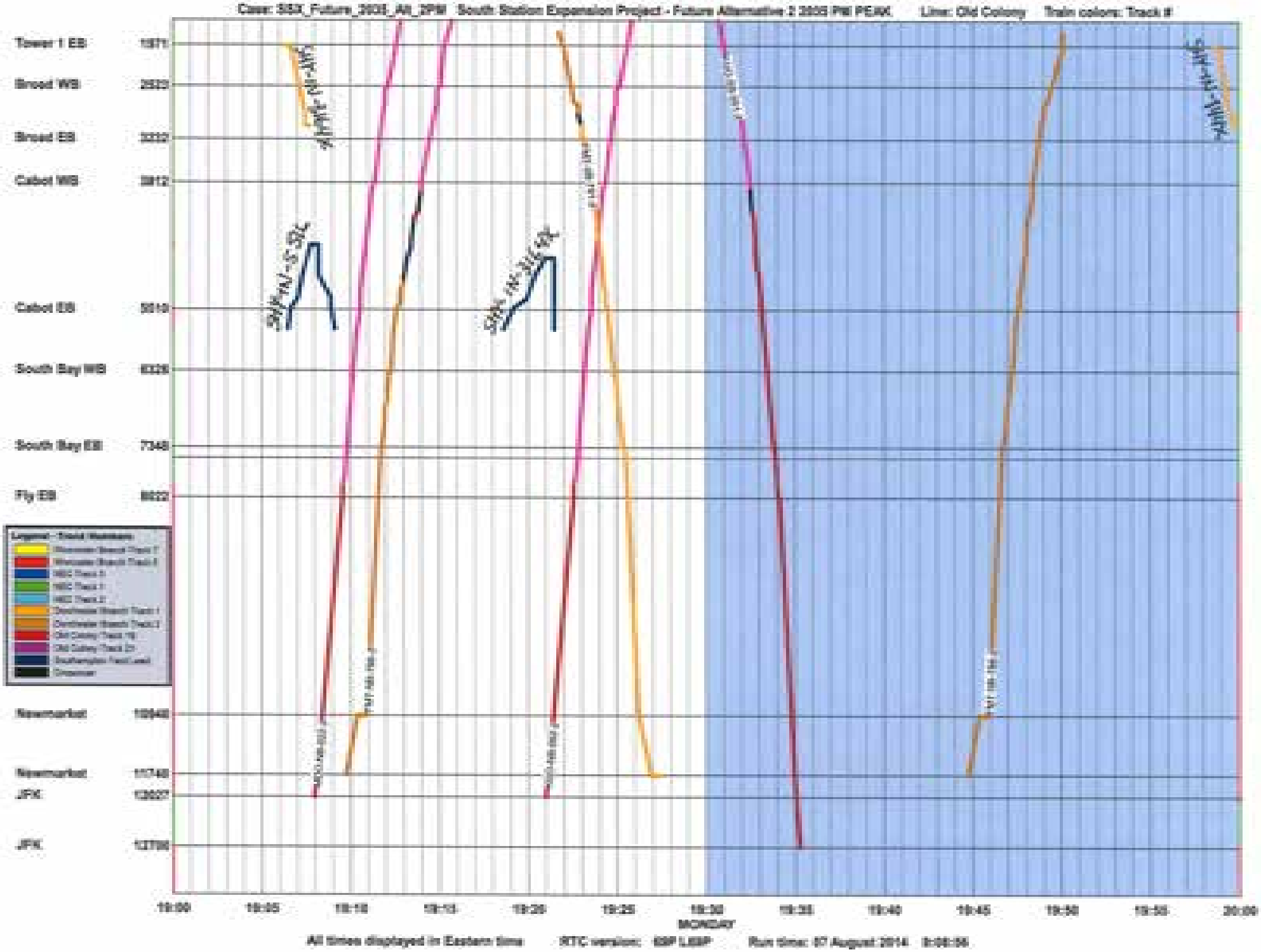

Case: SSX_Future_2035_Alt_2PM South Station Expansion Project - Future Alternative 2 2035 PM PEAK
Line: Old Colony
Trains colors: Track #
Tower 1 EB
Broad WB
Broad EB
Cabot WB
Cabot EB
South Bay WB
South Bay EB
Fly EB
Newmarket
Newmarket
JFK
JFK
14:00
14:05
14:10
14:15
14:20
14:25
14:30
MONDAY
14:35
14:40
14:45
14:50
14:55
15:00
All times displayed in Eastern time
RTC version: 69P L69P
Run time: 07 August 2014


Case: SSX_Future_2035_All_2PM South Station Expansion Project - Future Alternative 2 2035 PM PEAK
Line: Old Colony
Train colors: Track #
Tower 1 EB
1971
Broad WB
2323
Broad EB
3232
Cabot WB
3812
Cabot EB
5510
South Bay WB
6338
South Bay EB
7348
Fly EB
8622
Legend - Track Numbers
Newmarket
10940
Newmarket
11748
JFK
12627
JFK
13700
15:00
15:05
15:10
15:15
15:20
15:25
15:30
15:35
15:40
15:45
15:50
15:55
16:00
MONDAY
All times displayed in Eastern time
RTC version: SSP LSSP
Run time: 07 August 2014 9:06:54


Case: SSX_Future_2035_Alt_2PM South Station Expansion Project - Future Alternative 2 2035 PM PEAK Line: Old Colony Train colors: Track #
Tower 1 EB
Broad WB
Broad EB
Cabot WB
Cabot EB
South Bay WB
South Bay EB
Fly EB
Newmarket
Newmarket
JFK
JFK
16:00
16:05
16:10
16:15
16:20
16:25
16:30
MONDAY
16:35
16:40
16:45
16:50
16:55
17:00
All times displayed in Eastern time
RTC version: SSP LSSP
Run time: 07 August 2014


Case: SSX_Future_2035_Alt_2PM South Station Expansion Project - Future Alternative 2 2035 PM PEAK Line: Old Colony Train colors: Track #
Tower 1 EB
Broad WB
Broad EB
Cabot WB
Cabot EB
South Bay WB
South Bay EB
Fly EB
Newmarket
Newmarket
JFK
JFK
17:00
17:05
17:10
17:15
17:20
17:25
17:30
17:35
17:40
17:45
17:50
17:55
18:00
MONDAY
All times displayed in Eastern time
RTC version: ESP LSSP
Run time: 07 August 2014


Case: SSX_Future_2035_All_2PM South Station Expansion Project - Future Alternative 2 2035 PM PEAK
Line: Old Colony
Train colors: Track #
Tower 1 EB
Broad WB
Broad EB
Cabot WB
Cabot EB
South Bay WB
South Bay EB
Fly EB
Newmarket
Newmarket
JFK
JFK
18:00
18:05
18:10
18:15
18:20
18:25
18:30
18:35
18:40
18:45
18:50
18:55
19:00
MONDAY
All times displayed in Eastern time
RTC version: 6SP LSSP
Run time: 07 August 2014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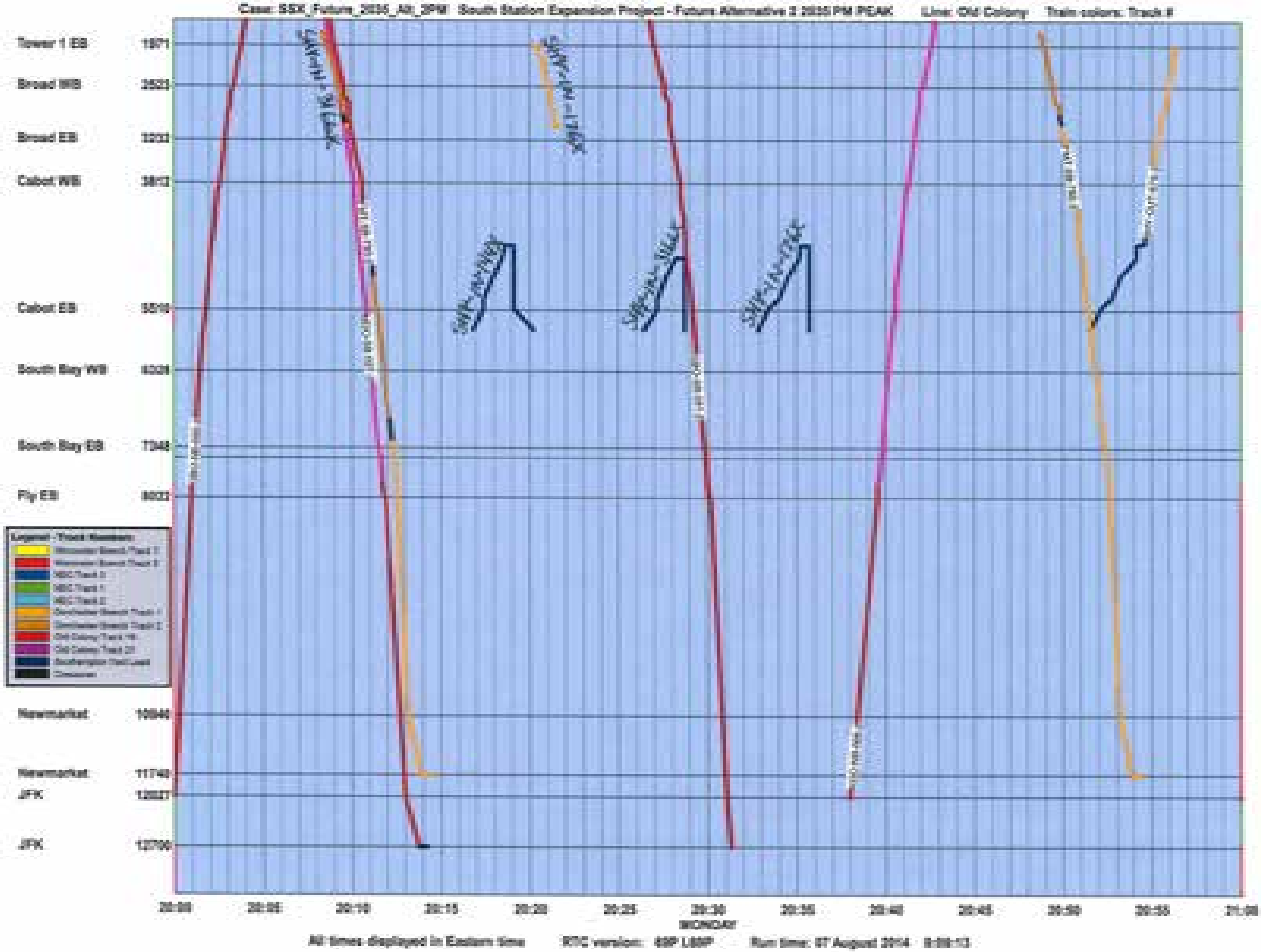
Tower 1 EB
Broad WB
Broad EB
Cabot WB
Cabot EB
South Bay WB
South Bay EB
Fly EB
Newmarket
Newmarket
JFK
JFK
MONDAY
All times displayed in Eastern time
RTC version: 63P LEIP
Run time: 07 August 2014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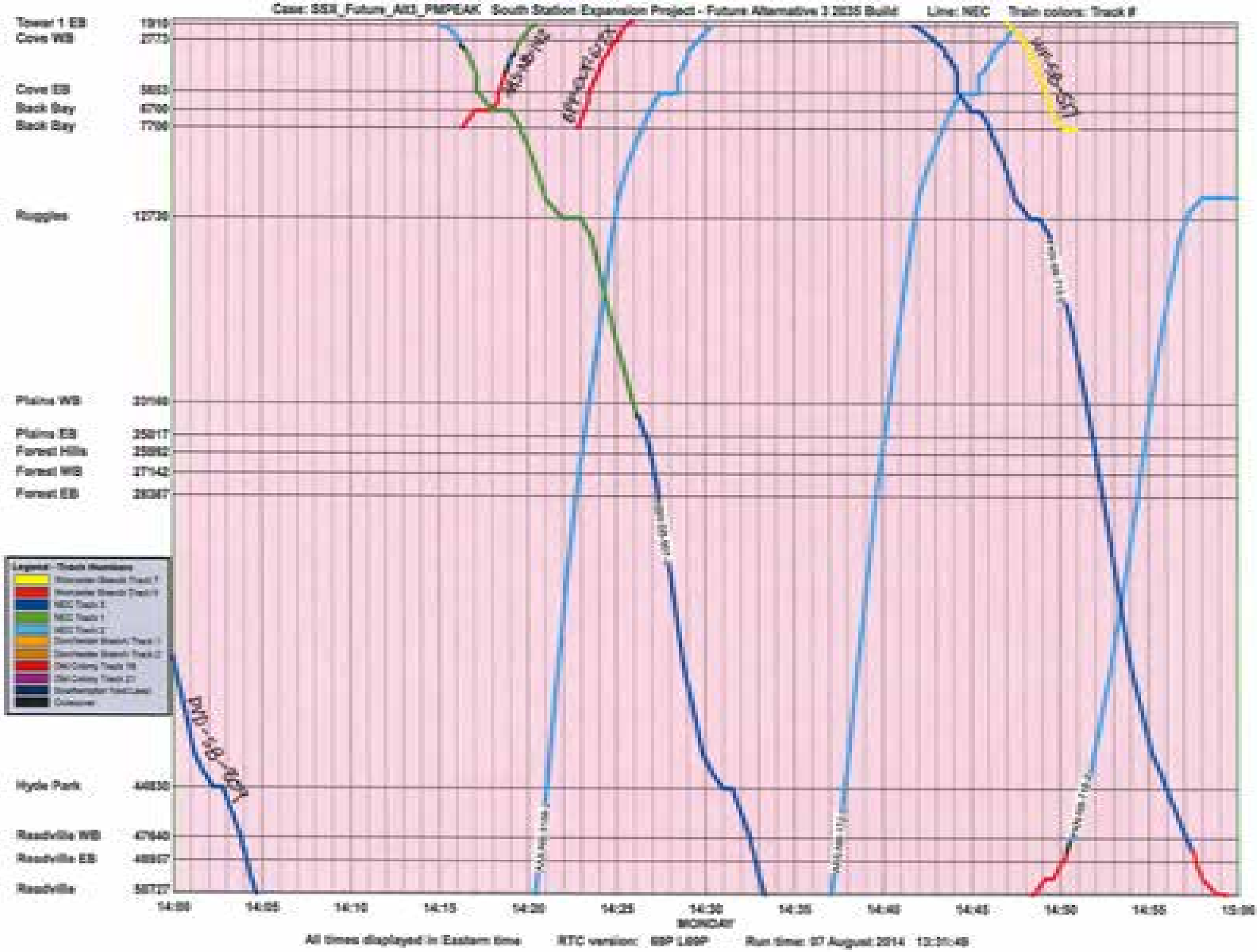
Line: Old Colony
Train colors: Track #
Tower 1 EB
Broad WB
Broad EB
Cabot WB
Cabot EB
South Bay WB
South Bay EB
Fly EB
Newmarket
Newmarket
JFK
JFK
MONDAY
All times displayed in Eastern time
RTC version: 69P L69P
Run time: 07 August 2014


Case: SSX_Future_Alt3_PMPEAK South Station Expansion Project - Future Alternative 3 2035 Build
Line: NEC
Train colors: Track #
Tower 1 EB
Cove WB
Cove EB
Back Bay
Back Bay
Ruggles
Route 128
Yawkey
Readville
Hyde Park
Readville WB
Readville EB
Readville
14:00
14:05
14:10
14:15
14:20
14:25
14:30
14:35
14:40
14:45
14:50
14:55
15:00
MONDAY
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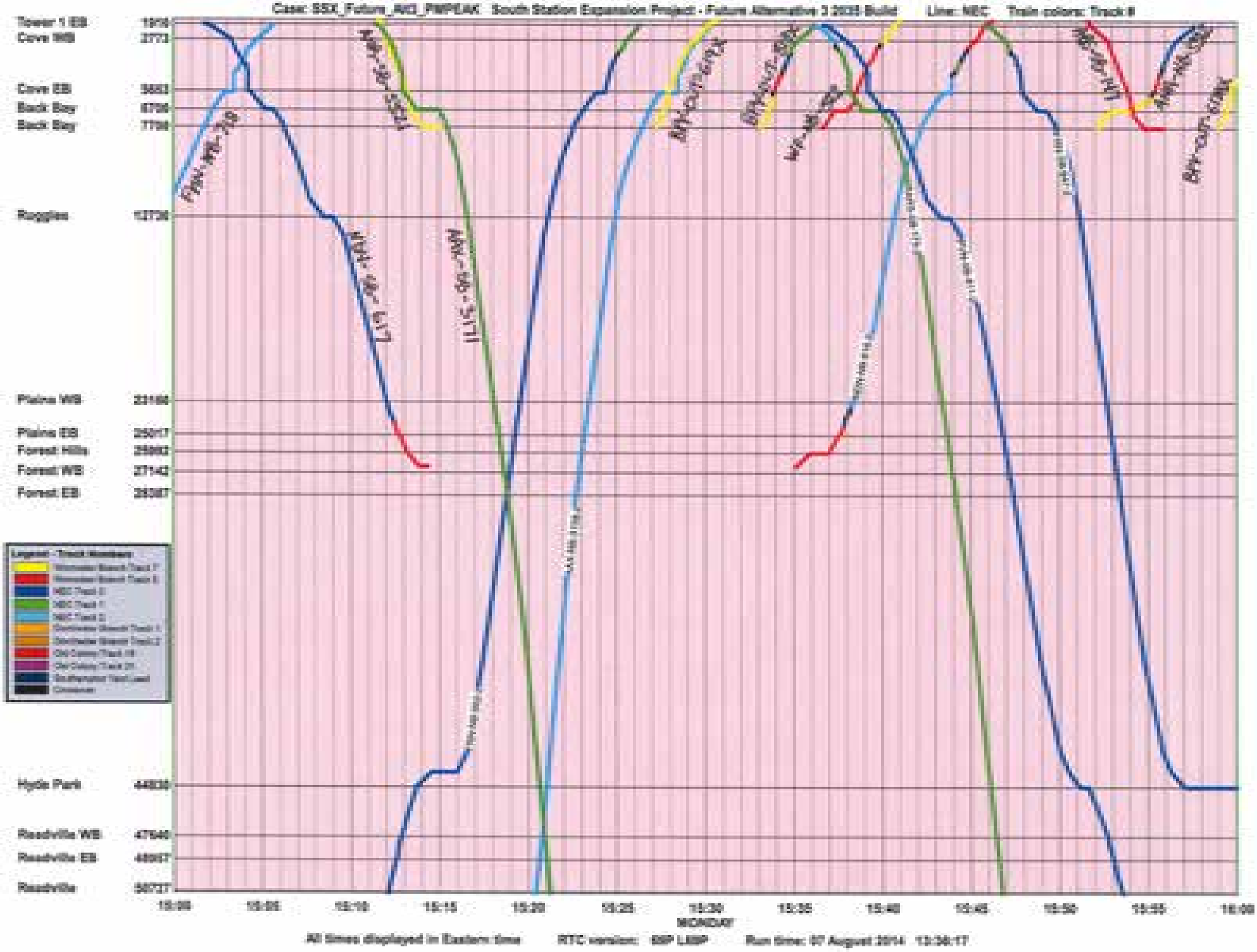
RTC version: 6SP L69P
Run time: 07 August 2014 13:31:48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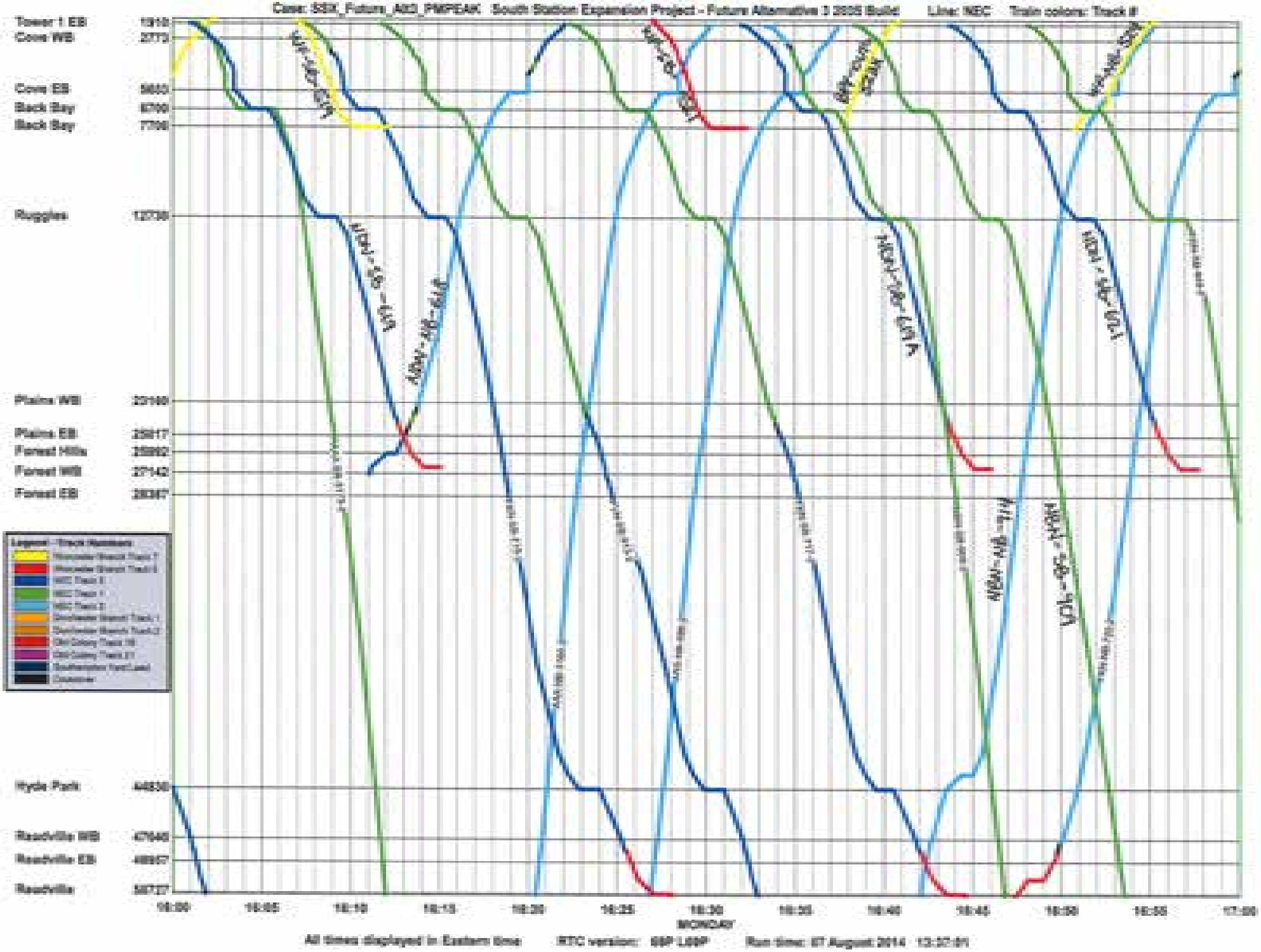
Line: NEC
Train colors: Track #
Tower 1 EB
Cove WB
Cove EB
Back Bay
Back Bay
Roggles
Plains WB
Plains EB
Forest Hills
Forest WB
Forest EB
Hyde Park
Readville WB
Readville EB
Readville
15:00
15:05
15:10
15:15
15:20
15:25
15:30
15:35
15:40
15:45
15:50
15:55
16:00
MONDAY
All times displayed in Eastern time
RTC version: SSP LSSP
Run time: 07 August 2014 13:36:17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Line: NEC
Train colors: Track #
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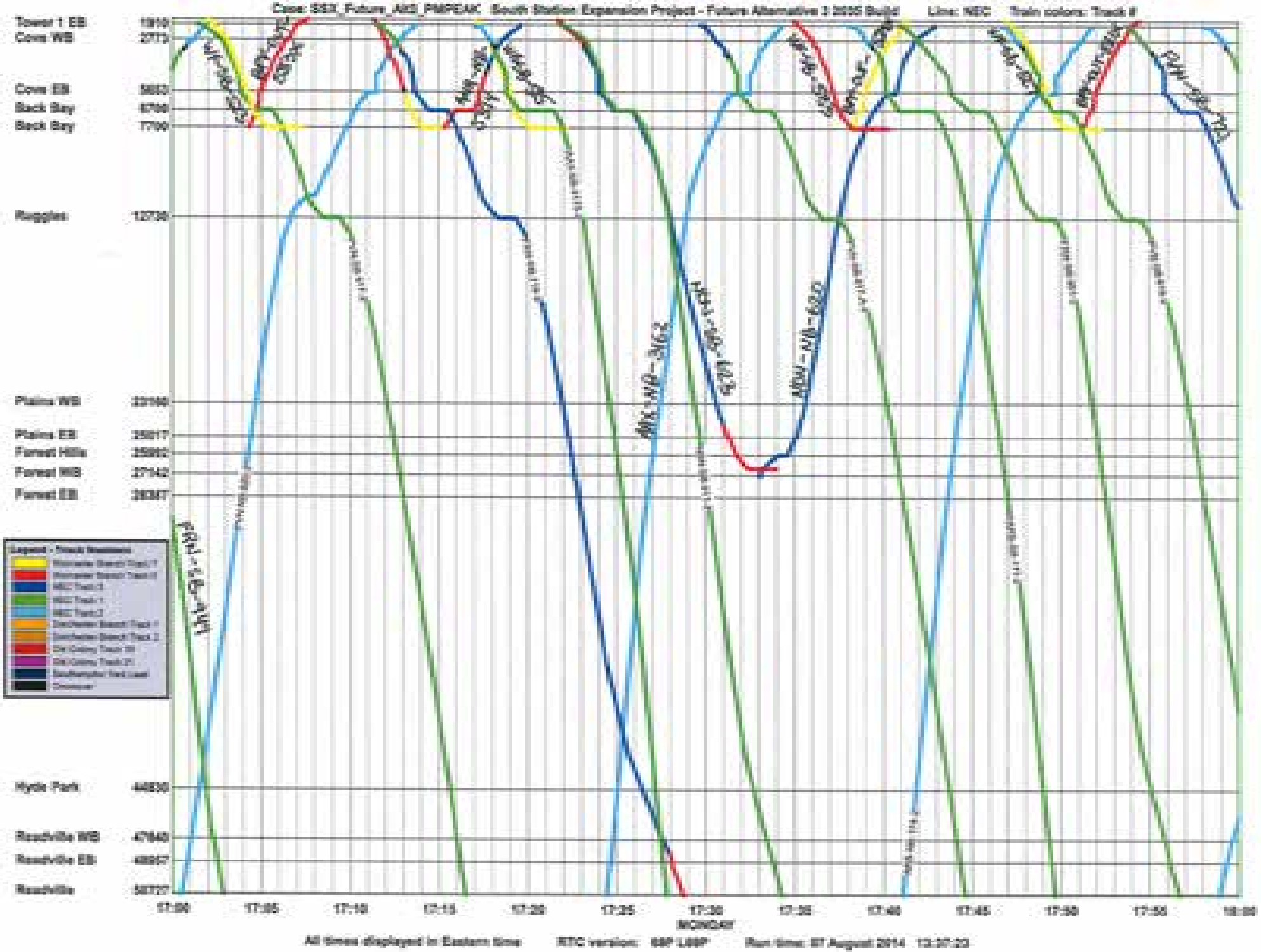
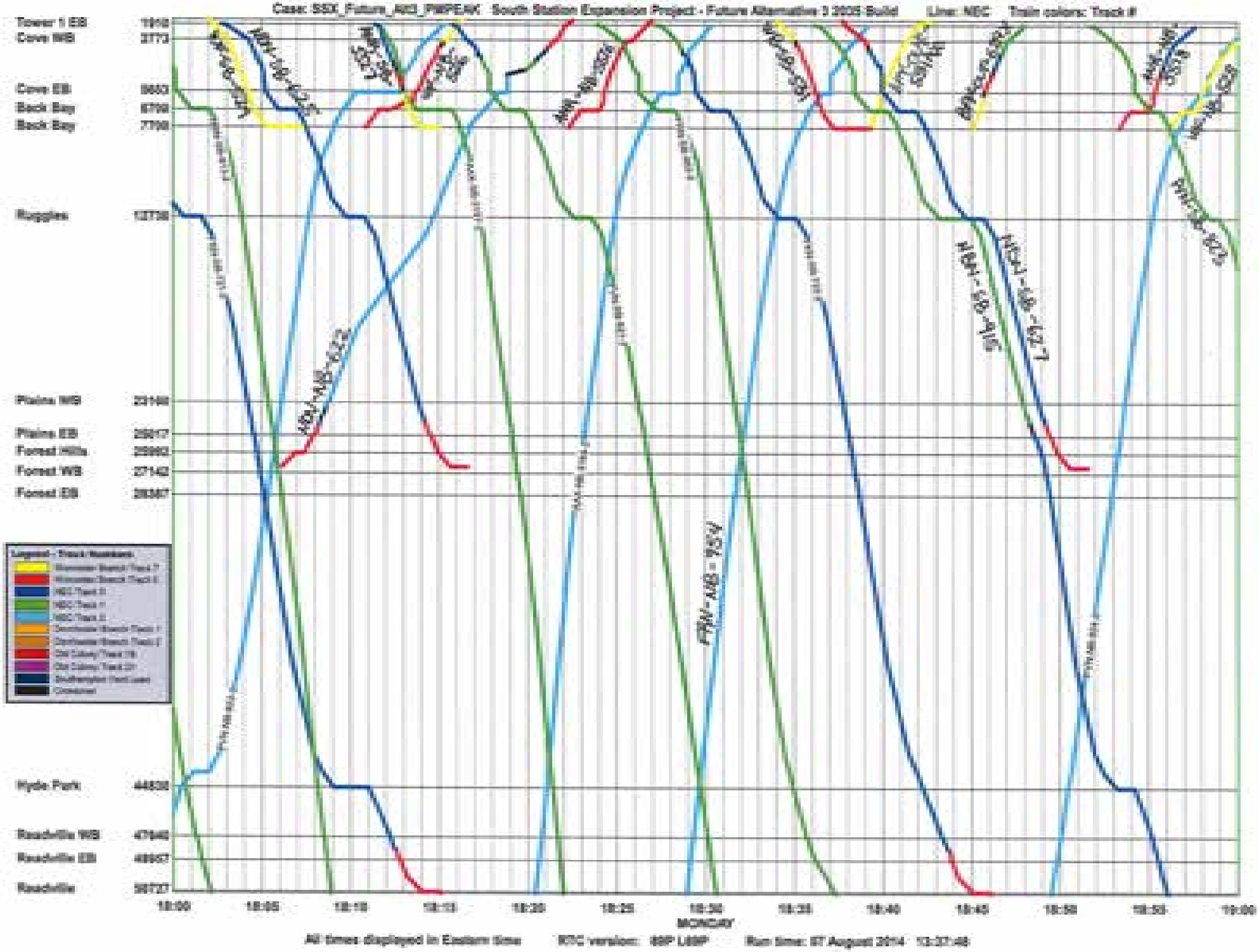
Cove WB
Cove EB
Back Bay
Back Bay
Ruggles
Plains WB
Plains EB
Forest Hills
Forest WB
Forest EB
Hyde Park
Readville WB
Readville EB
Readville
MONDAY
All times displayed in Eastern time
RTC version: 69P L69P
Run time: 07 August 2014


Case: SSX_Future_Alt3_PMPEAK South Station Expansion Project - Future Alternative 3 2035 Build
Line: NEC
Train colors: Track #
Tower 1 EB
Cove WB
Cove EB
Back Bay
Back Bay
Ruggles
Plains WB
Plains EB
Forest Hills
Forest WB
Forest EB
Hyde Park
Readville WB
Readville EB
Readville
17:00
17:05
17:10
17:15
17:20
17:25
17:30
17:35
17:40
17:45
17:50
17:55
18:00
MONDAY
All times displayed in Eastern time
RTC version: 69P L69P
Run time: 07 August 2014 13:27:23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Line: NEC
Train colors: Track #
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Cove EB
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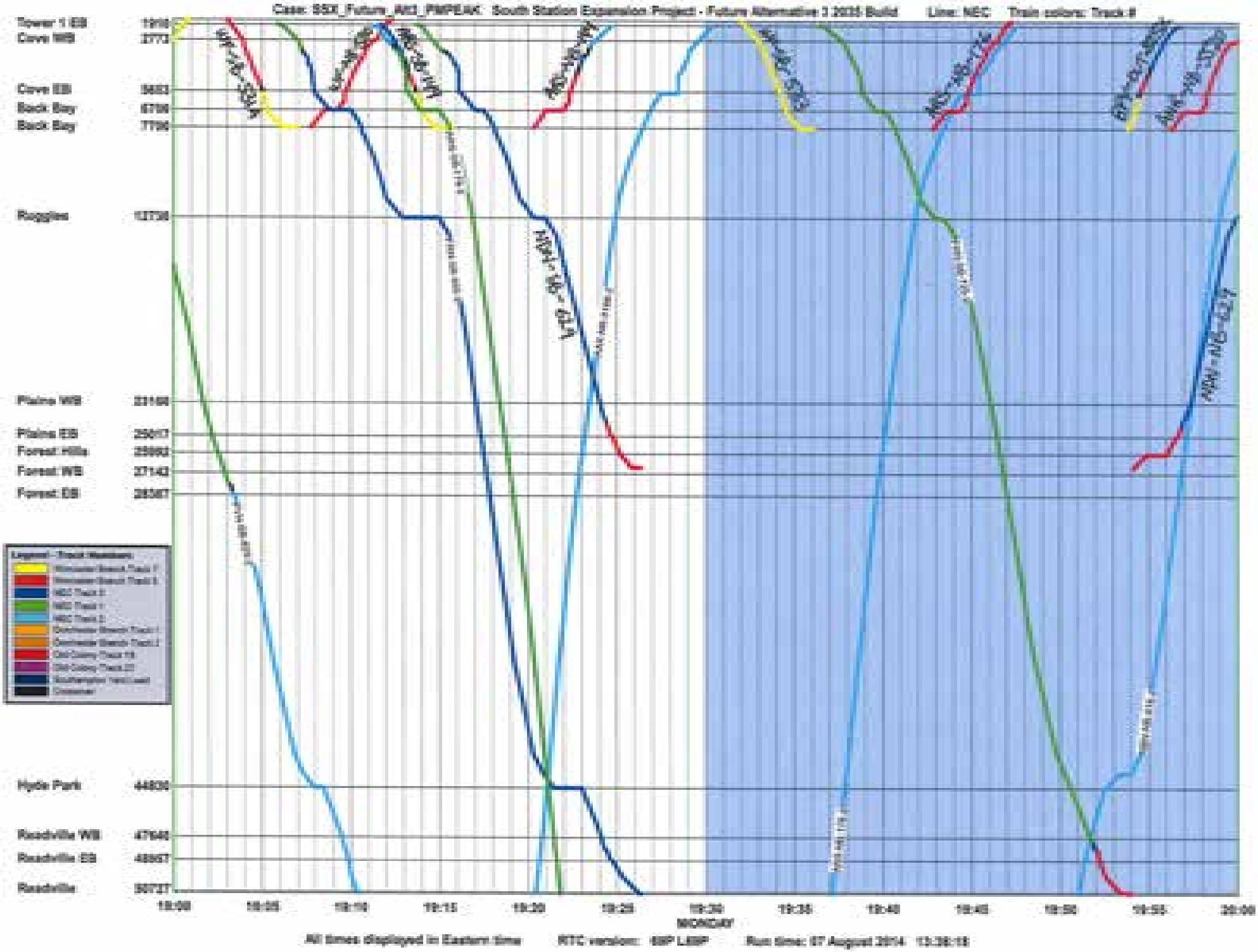
Back Bay
Ruggles
Plains WB
Plains EB
Forest Hills
Forest WB
Forest EB
Hyde Park
Readville WB
Readville EB
Readville
18:00
18:05
18:10
18:15
18:20
18:25
18:30
18:35
18:40
18:45
18:50
18:55
19:00
MONDAY
All times displayed in Eastern time
RTC version: 6SP U6SP
Run time: 07 August 2014 13:37:48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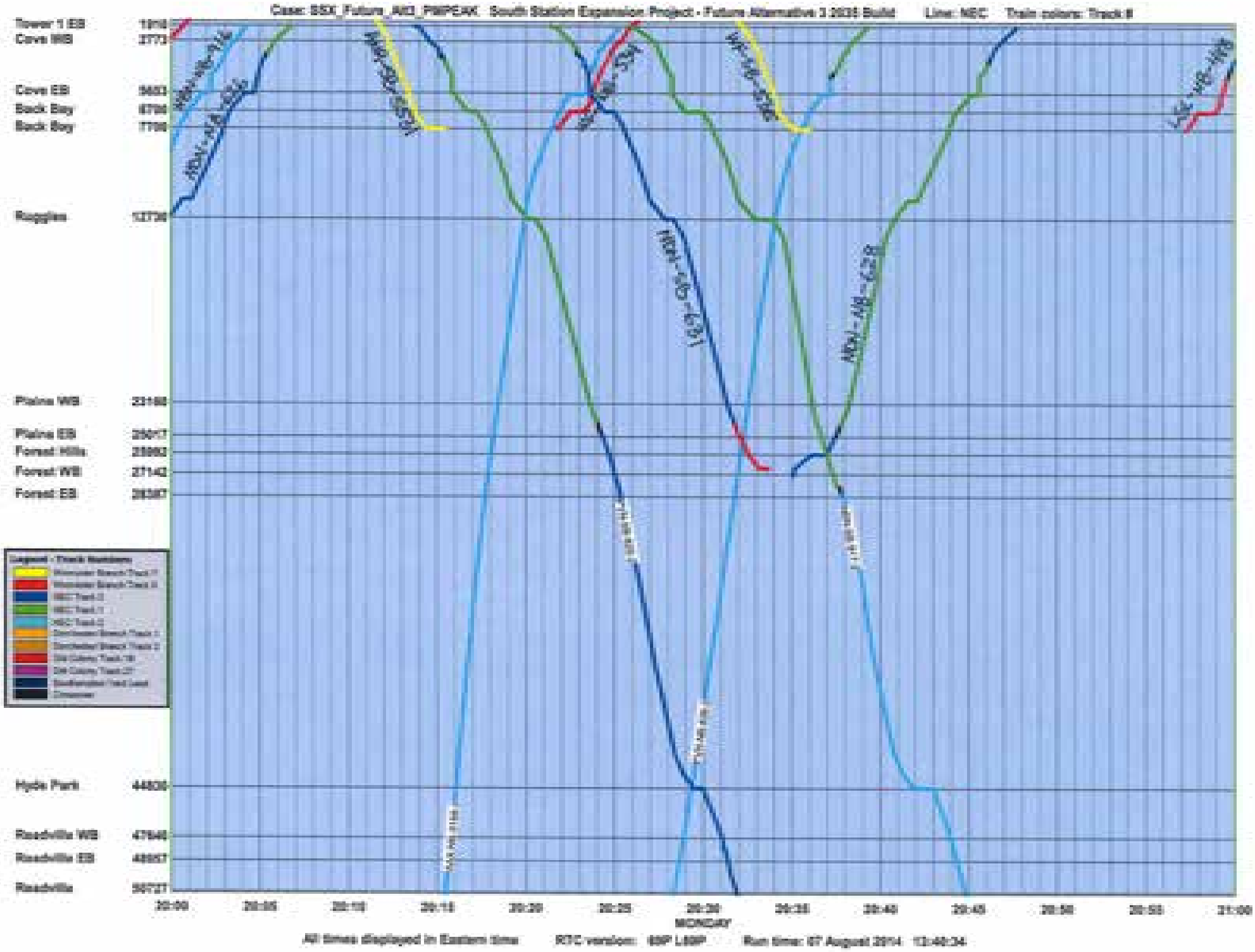
Line: NEC
Train colors: Track #
Tower 1 EB
Cove WB
Cove EB
Back Bay
Back Bay
Ruggles
Plaine WB
Plaine EB
Forest Hills
Forest WB
Forest EB
Hyde Park
Readville WB
Readville EB
Readville
MONDAY
All times displayed in Eastern time
RTC version: 6IP L6IP
Run time: 07 August 2014 13:38:18


Case: SSX_Future_A03_PMPEAK South Station Expansion Project - Future Alternative 3 2035 Build
Line: NEC
Train colors: Track #
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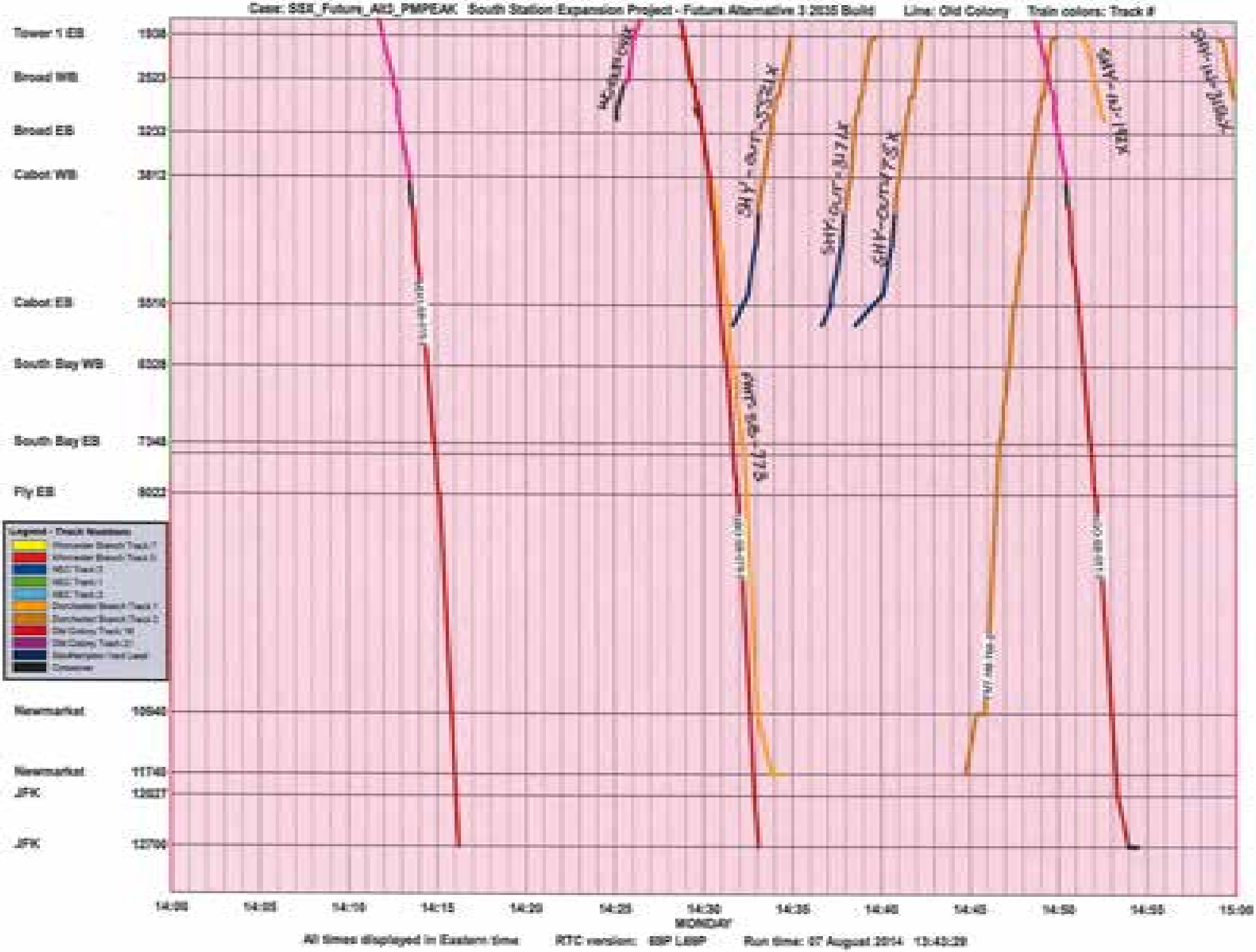
Cove WB
Cove EB
Back Bay
Back Bay
Ruggles
Prairie WB
Prairie EB
Forest Hills
Forest WB
Forest EB
Hyde Park
Readville WB
Readville EB
Readville
20:00
20:05
20:10
20:15
20:20
20:25
20:30
MONDAY
20:35
20:40
20:45
20:50
20:55
21:00
All times displayed in Eastern time
RTC version: 69P L69P
Run time: 07 August 2014 13:46:34


Case: SSS_Future_Alt3_PMPEAK South Station Expansion Project - Future Alternative 3 2035 Build
Line: Old Colony
Train colors: Track #
Tower 1 EB
Broad WB
Broad EB
Cabot WB
Cabot EB
South Bay WB
South Bay EB
Fly EB
Newmarket
Newmarket
JFK
JFK
14:00
14:05
14:10
14:15
14:20
14:25
14:30
MONDAY
14:35
14:40
14:45
14:50
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15:00
All times displayed in Eastern time
RTC version: 69P L69P
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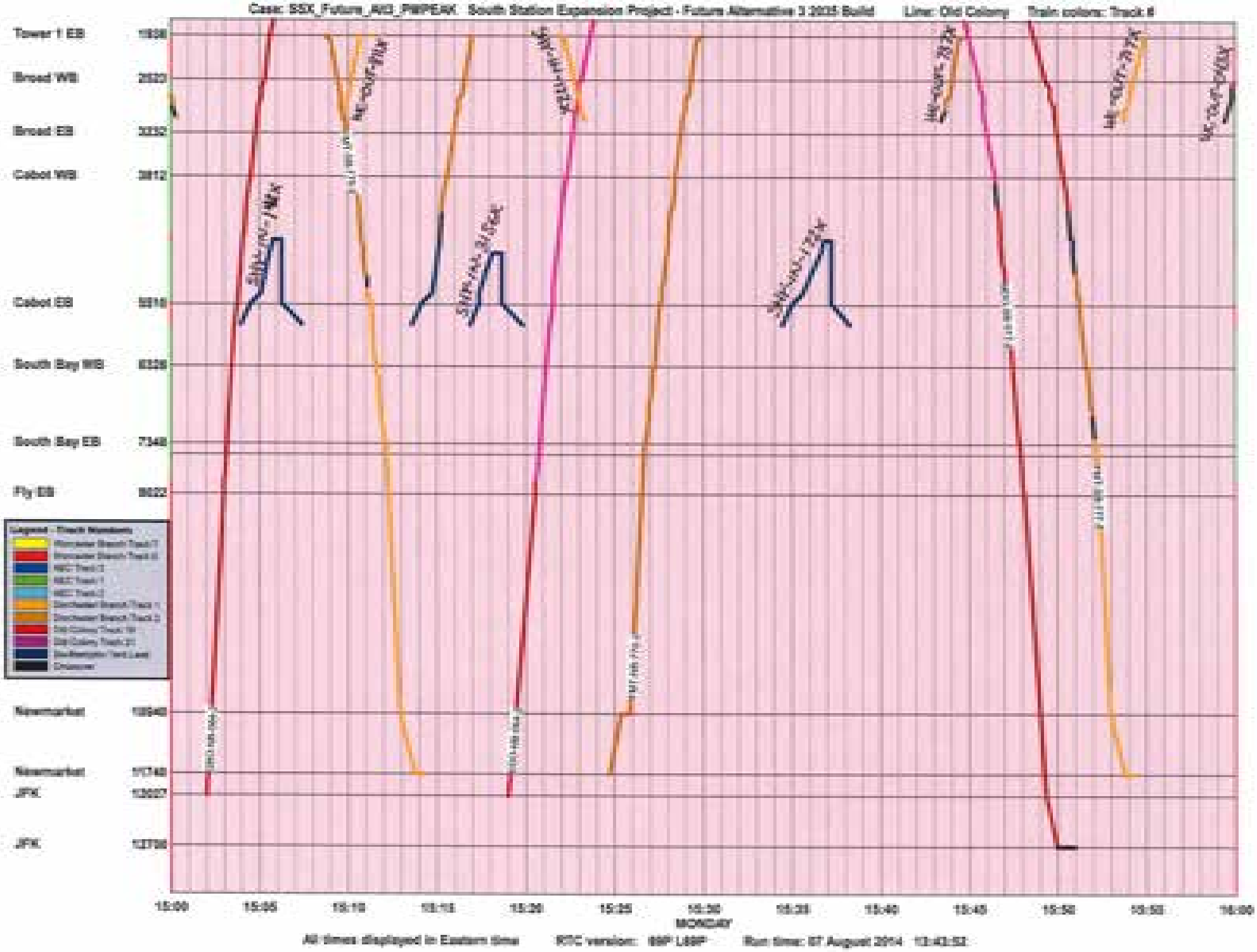
Case: SSX_Future_A03_PMPEAK South Station Expansion Project - Future Alternative 3 2035 Build
Line: Old Colony
Train colors: Track #
Tower 1 EB
Broad WB
Broad EB
Cabot WB
Cabot EB
South Bay WB
South Bay EB
Fly EB
Newmarket
Newmarket
JFK
JFK
15:00
15:05
15:10
15:15
15:20
15:25
15:30
15:35
15:40
15:45
15:50
15:55
16:00
MONDAY
All times displayed in Eastern time
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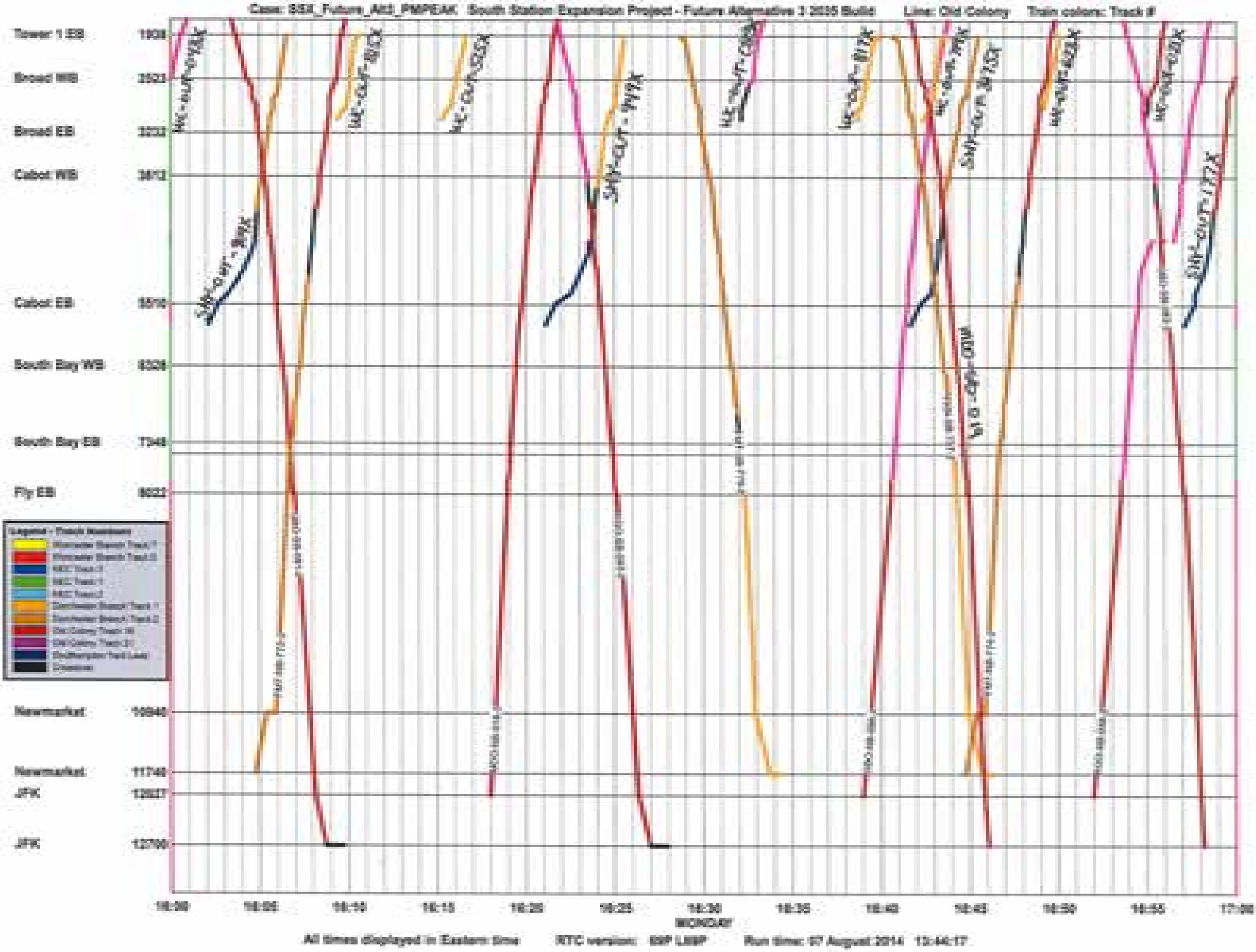
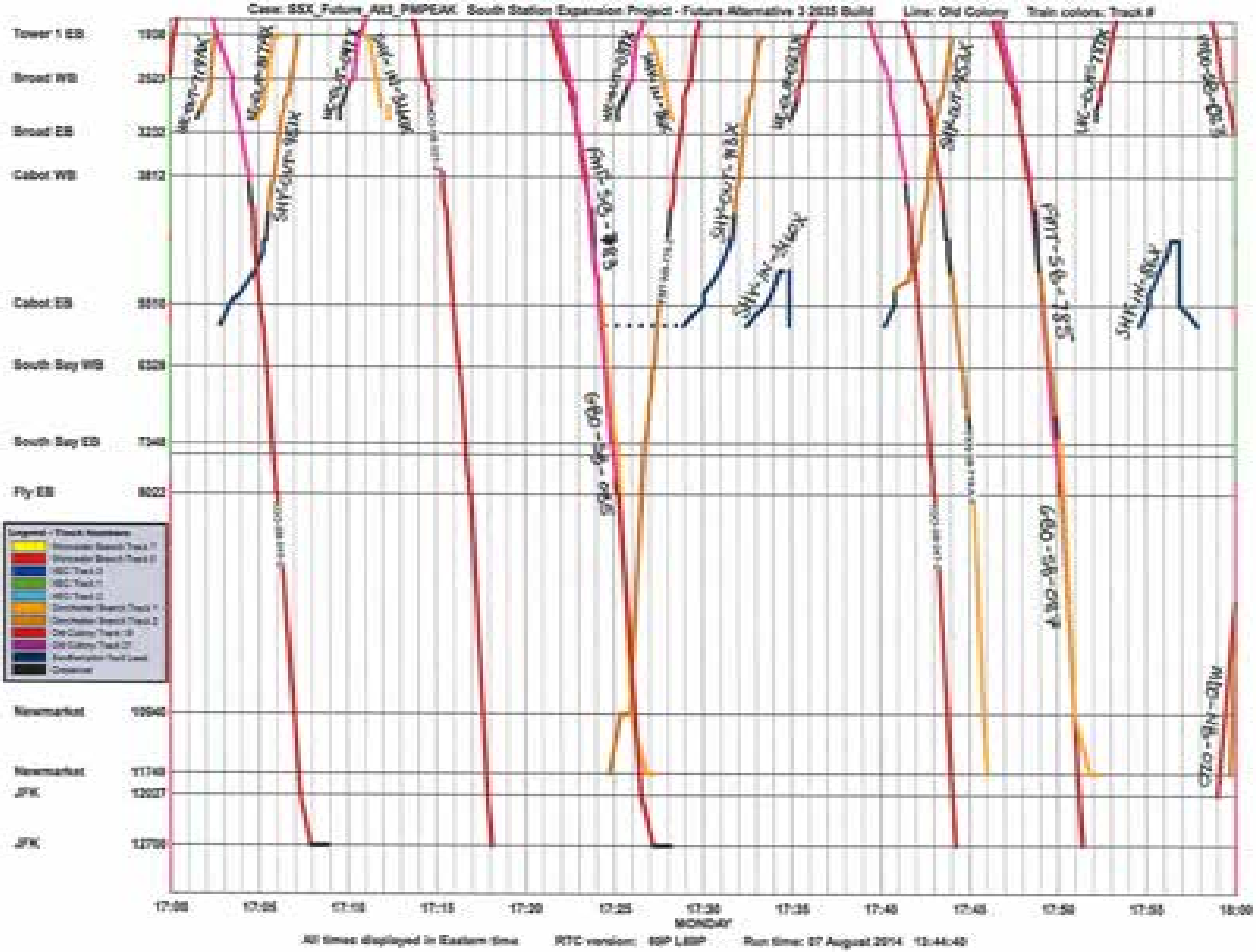
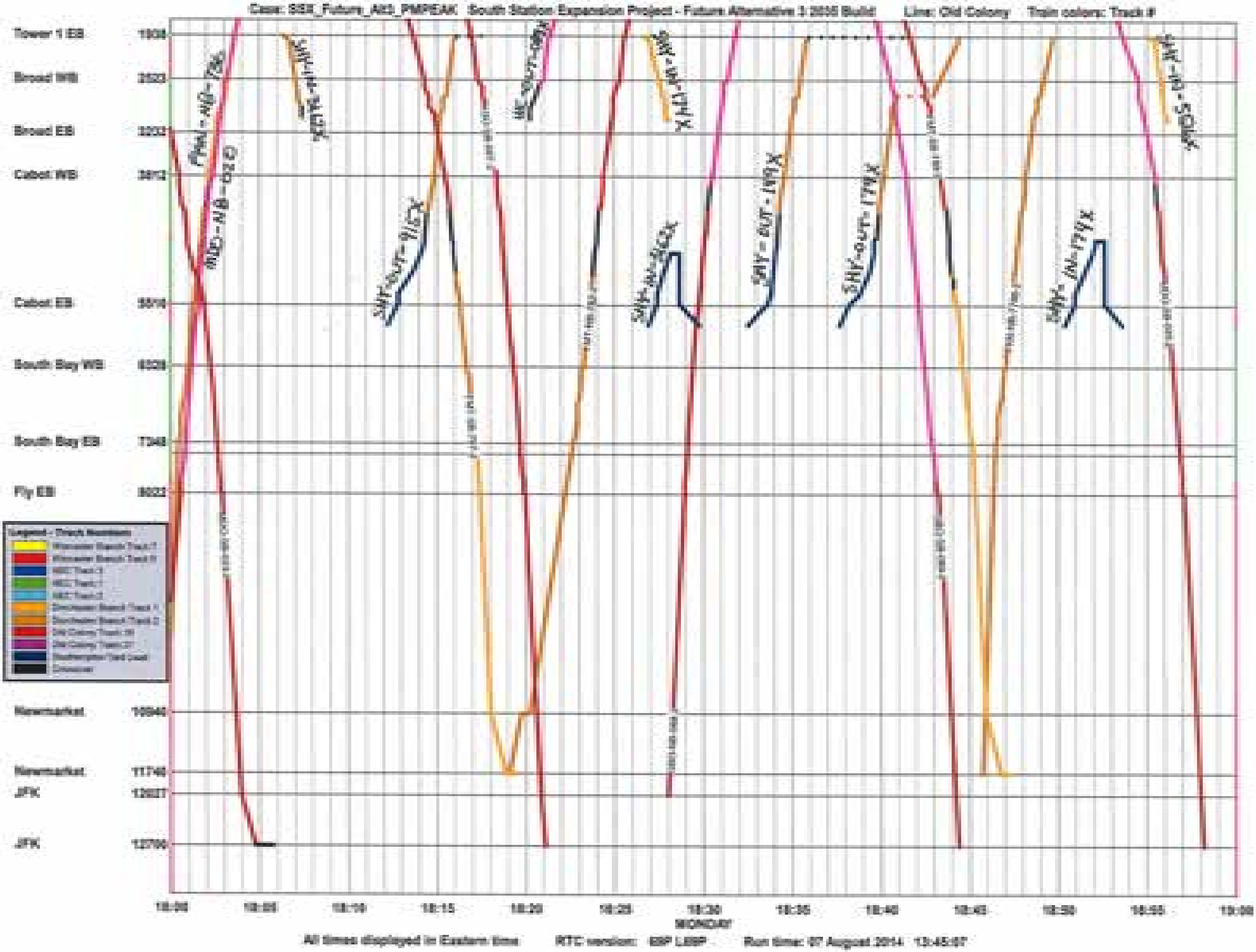
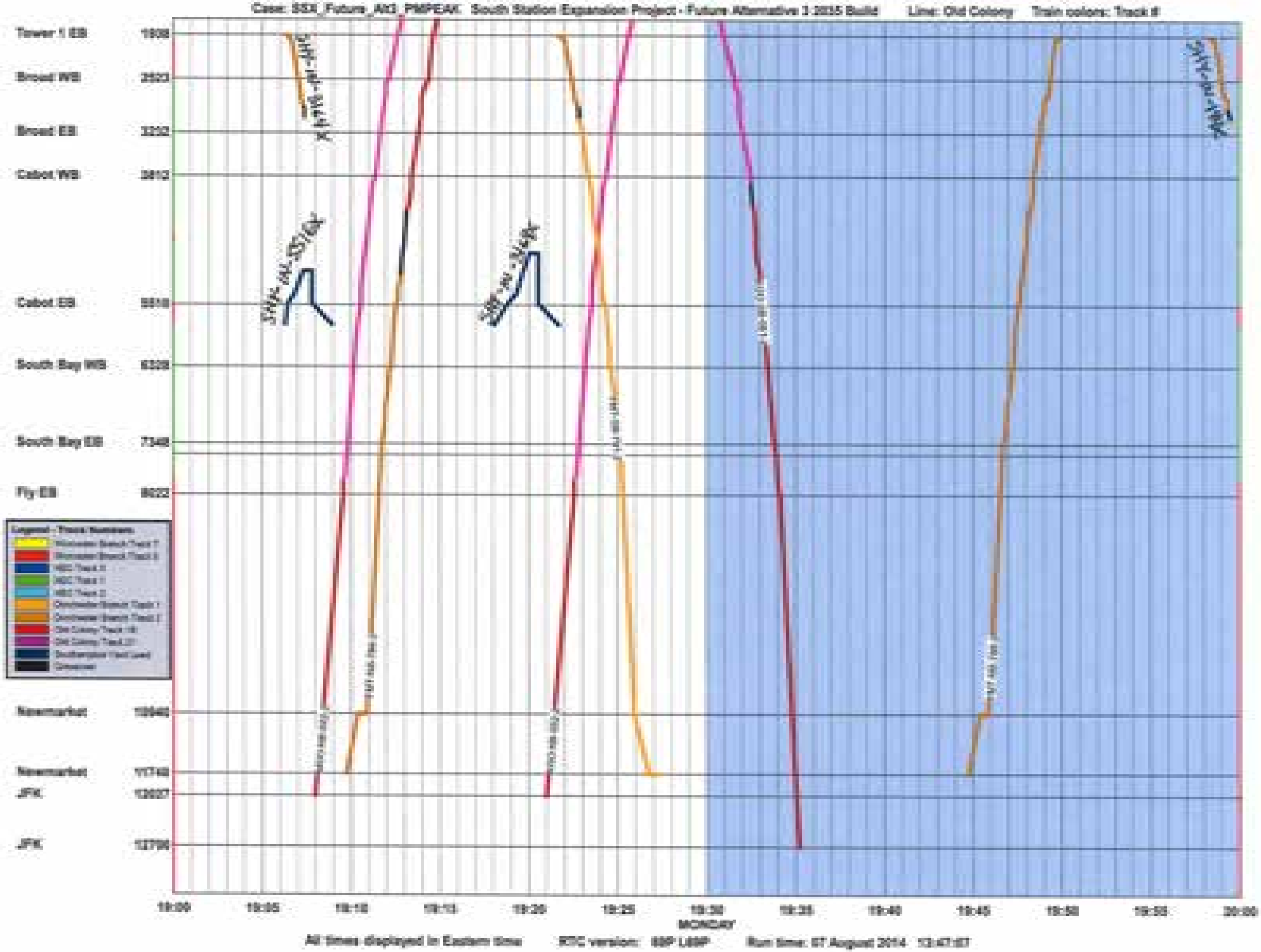
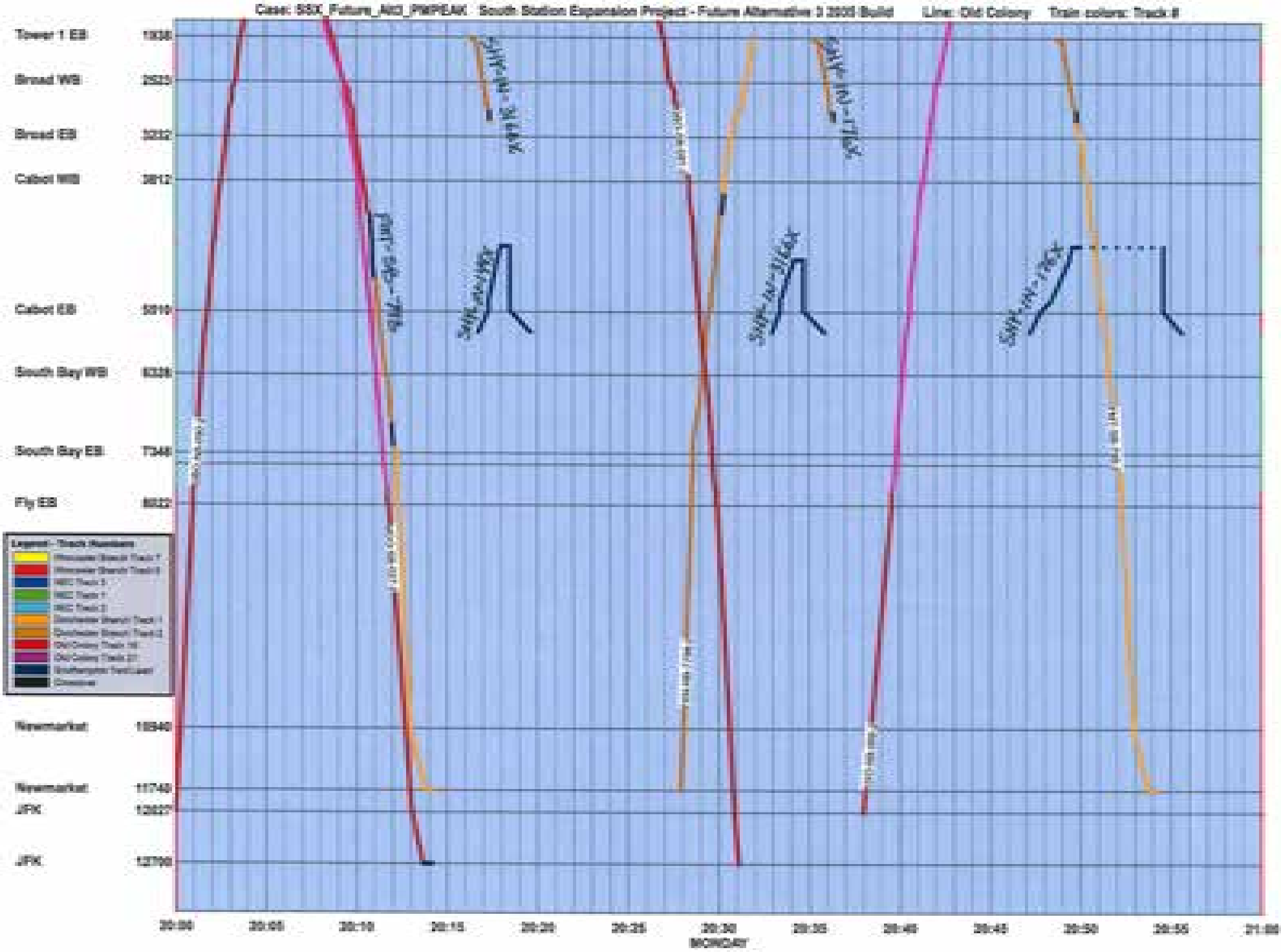
Run time: 07 August 2014 13:43:53


Case: SSX_Future_Alt3_PMPEAK South Station Expansion Project - Future Alternative 3 2035 Build
Line: Old Colony
Train colors: Track #
Tower 1 EB
Broad WB
Broad EB
Cabot WB
Cabot EB
South Bay WB
South Bay EB
Fly EB
Newmarket
Newmarket
JFK
JFK
Legend - Track Numbers
16:00
16:05
16:10
16:15
16:20
16:25
16:30
16:35
16:40
16:45
16:50
16:55
17:00
MONDAY
All times displayed in Eastern time
RTC version: 69P L69P
Run time: 07 August 2014 13:44:17


Case: SSX_Future_Alt3_PMPEAK South Station Expansion Project - Future Alternative 3 2035 Build
Line: Old Colony
Train colors: Track #
Tower 1 EB
Broad WB
Broad EB
Cabot WB
Cabot EB
South Bay WB
South Bay EB
Fly EB
Newmarket
Newmarket
JFK
JFK
MONDAY
All times displayed in Eastern time
RTC version: 69P LBIP
Run time: 07 August 2014 13:44:40


Case: SSX_Future_Alt3_PMPEAK South Station Expansion Project - Future Alternative 3 2035 Build
Line: Old Colony
Train colors: Track #
Tower 1 EB
Broad WB
Broad EB
Cabot WB
Cabot EB
South Bay WB
South Bay EB
Fly EB
Newmarket
Newmarket
JFK
JFK
1938
2523
3203
3813
5576
6528
7348
8022
10946
11746
12627
12766
18:00
18:05
18:10
18:15
18:20
18:25
18:30
MONDAY
18:35
18:40
18:45
18:50
18:55
19:00
All times displayed in Eastern time
RTC version: 6SP LSSP
Run time: 07 August 2014 13:45:07


Case: SSX_Future_Alt3_PMPEAK South Station Expansion Project - Future Alternative 3 2035 Build
Line: Old Colony
Train colors: Track #
Tower 1 EB
Broad WB
Broad EB
Cabot WB
Cabot EB
South Bay WB
South Bay EB
Fly EB
Newmarket
Newmarket
JFK
JFK
MONDAY
All times displayed in Eastern time
RTC version: SSP LSSP
Run time: 07 August 2014 13:47:07


Case: SSX_Future_AltO_PMPEAK South Station Expansion Project - Future Alternative 3 2035 Build
Line: Old Colony
Train colors: Track #
Tower 1 EB
Broad WB
Broad EB
Cabot WB
Cabot EB
South Bay WB
South Bay EB
Fly EB
Newmarket
Newmarket
JFK
JFK
Legend - Track Numbers
20:00
20:05
20:10
20:15
20:20
20:25
20:30
MONDAY
20:35
20:40
20:45
20:50
20:55
21:00
All times displayed in Eastern time
RTC version: 6SP LSSP
Run time: 07 August 2014 13:48:47

Attachment D –
Future 2035 PM Peak Period South Station Track Occupancy Charts

Alternative 2 PM Peak Period South Station Platform Track Occupancy Chart
Alternative 3 PM Peak Period South Station Platform Track Occupancy Chart

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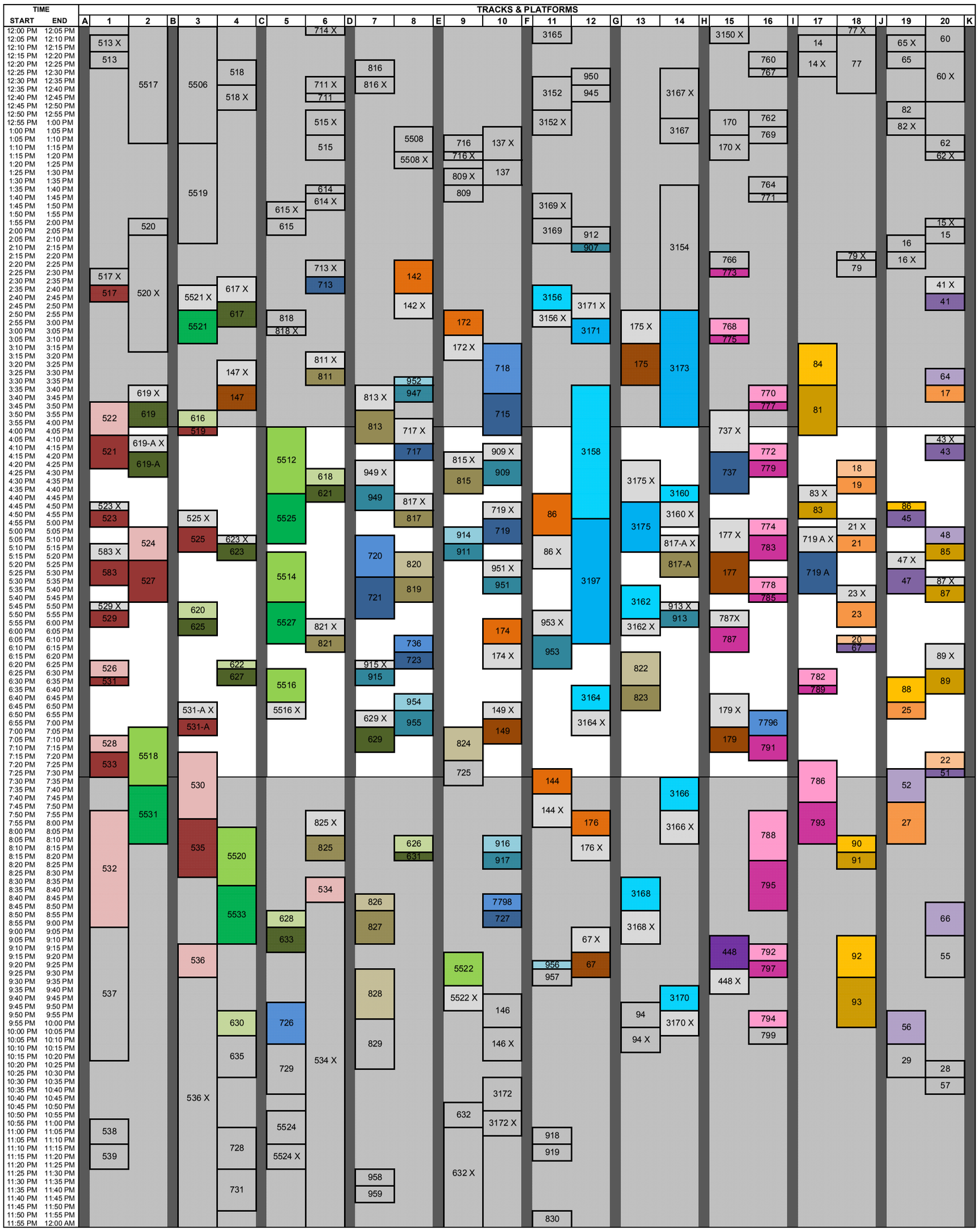
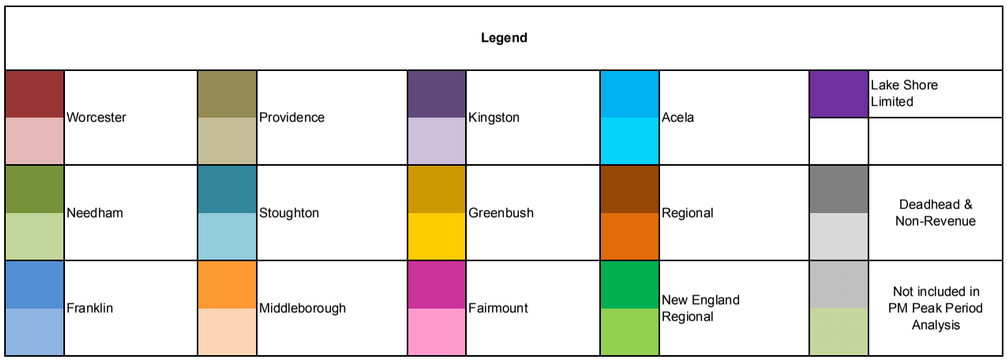
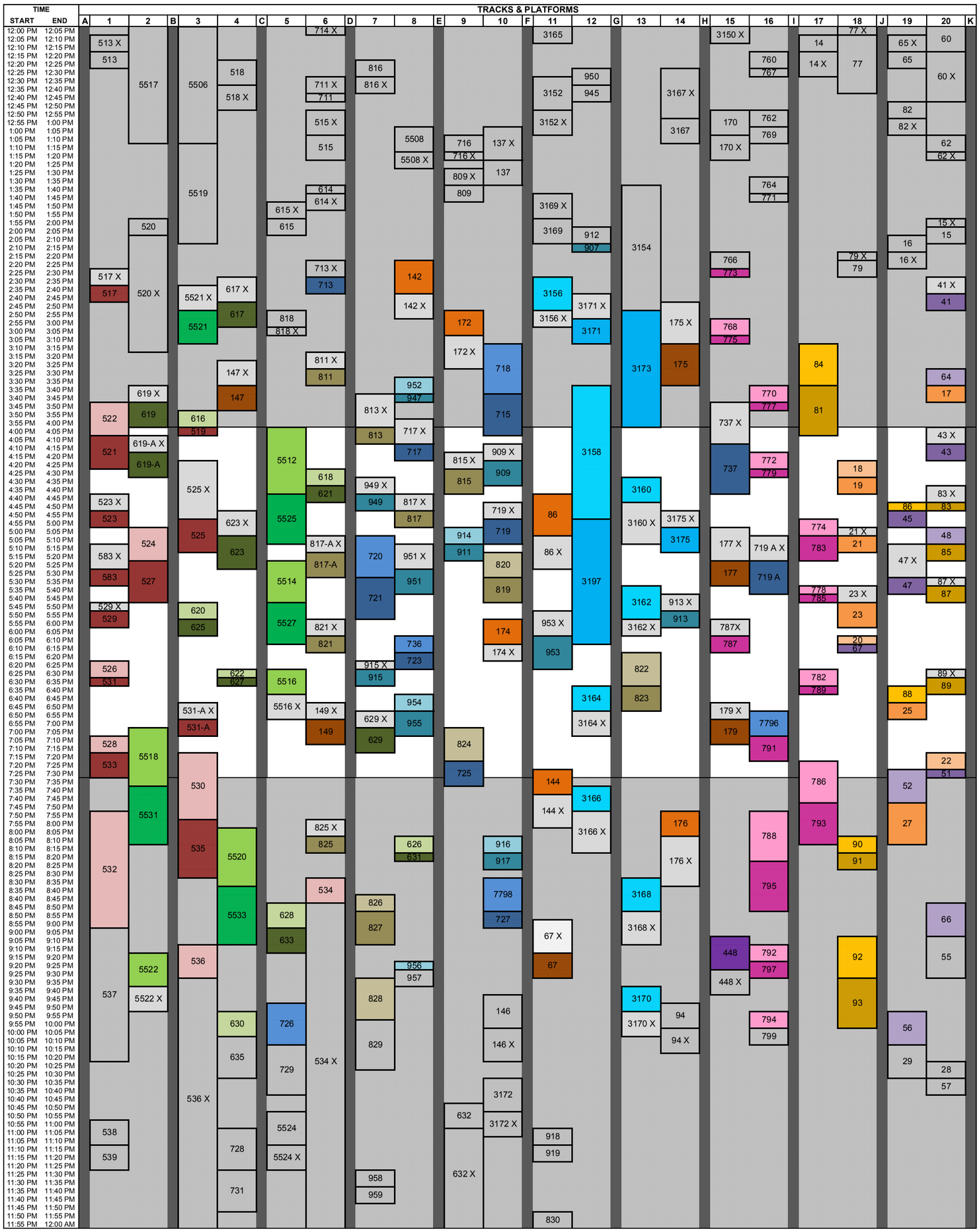


Colored trains shown on the Track Occupancy Chart are represented in the RTC model.
PM Period Analysis On-time Performance and Delay Results only include trains arriving at or departing from South Station between 4:00 PM and 7:30 PM.





Colored trains shown on the Track Occupancy Chart are represented in the RTC model.
PM Period Analysis On-time Performance and Delay Results only include trains arriving at or departing from South Station between 4:00 PM and 7:30 PM.

Legend

	Worcester		Providence		Kingston		Lake Shore Limited
	Needham		Stoughton		Greenbush		Deadhead & Non-Revenue
	Franklin		Middleborough		Fairmount		Not included in PM Peak Period Analysis

Attachment E – Future 2035 PM Peak Period Simulation Results

Alternative 2 PM Peak Period Simulation Results
Alternative 3 PM Peak Period Simulation Results

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South Station Expansion Project Operations Analysis
PM Period Simulation Alternatives
Delay & On-Time Performance Results

		Alternative 2		Alternative 3	
Deterministic Results	**Train Group**	**Delay %**	**OTP %**	**Delay %**	**OTP %**
	Acela	0.37%	100.00%	0.51%	100.00%
	Regional	5.14%	100.00%	7.43%	100.00%
	NE Regional	0.00%	100.00%	0.00%	100.00%
	MBTA	1.53%	100.00%	2.18%	100.00%
	Total	1.59%	100.00%	2.28%	100.00%

		Alternative 2		Alternative 3	
Randomized Results	**Train Group**	**Delay %**	**OTP %**	**Delay %**	**OTP %**
	Acela	6.74%	100.00%	12.98%	100.00%
	Regional	7.49%	100.00%	13.02%	100.00%
	NE Regional	6.28%	100.00%	14.65%	100.00%
	MBTA	6.71%	95.50%	12.99%	92.55%
	Total	6.74%	96.32%	13.06%	93.92%

SSX Project Alternative 2 - PM Period - Randomized Runs - Delay and On-Time Performance Results

	Randomized 1		Randomized 2		Randomized 3		Randomized 4		Randomized 5		Randomized 6		Randomized 7		Randomized 8		Randomized 9		Randomized 10	
Train Group	Delay (%)	OTP (%)	Delay (%)	OTP (%)	Delay (%)	OTP (%)	Delay (%)	OTP (%)	Delay (%)	OTP (%)	Delay (%)	OTP (%)	Delay (%)	OTP (%)	Delay (%)	OTP (%)	Delay (%)	OTP (%)	Delay (%)	OTP (%)
Acela	6.71%	100.00%	3.16%	100.00%	2.74%	100.00%	7.06%	100.00%	3.94%	100.00%	5.39%	100.00%	7.74%	100.00%	5.52%	100.00%	9.00%	100.00%	7.17%	100.00%
Regional	11.01%	100.00%	10.60%	100.00%	7.17%	100.00%	7.16%	100.00%	6.51%	100.00%	8.27%	100.00%	6.66%	100.00%	7.75%	100.00%	9.87%	100.00%	7.01%	100.00%
NE Regional	7.54%	100.00%	5.09%	100.00%	5.91%	100.00%	3.45%	100.00%	9.81%	100.00%	9.38%	100.00%	4.24%	100.00%	7.69%	100.00%	5.69%	100.00%	6.79%	100.00%
MBTA	8.36%	92.90%	8.69%	94.10%	3.17%	100.00%	7.35%	94.10%	7.93%	95.30%	3.33%	100.00%	6.11%	96.50%	6.14%	96.50%	6.73%	94.10%	5.99%	96.50%
Total	8.35%	94.20%	8.22%	95.20%	3.49%	100.00%	7.15%	95.20%	7.61%	96.20%	4.04%	100.00%	6.20%	97.10%	6.25%	97.10%	7.06%	95.20%	6.18%	97.10%

SSX Project Alternative 3 - PM Period - Randomized Runs - Delay and On-Time Performance Results

	Randomized 1		Randomized 2		Randomized 3		Randomized 4		Randomized 5		Randomized 6		Randomized 7		Randomized 8		Randomized 9		Randomized 10	
Train Group	Delay (%)	OTP (%)	Delay (%)	OTP (%)	Delay (%)	OTP (%)	Delay (%)	OTP (%)	Delay (%)	OTP (%)	Delay (%)	OTP (%)	Delay (%)	OTP (%)	Delay (%)	OTP (%)	Delay (%)	OTP (%)	Delay (%)	OTP (%)
Acela	14.29%	100.00%	9.90%	100.00%	7.36%	100.00%	17.07%	100.00%	13.44%	100.00%	15.80%	100.00%	9.28%	100.00%	12.52%	100.00%	10.19%	100.00%	14.83%	100.00%
Regional	15.39%	100.00%	12.59%	100.00%	13.41%	100.00%	11.92%	100.00%	9.27%	100.00%	15.52%	100.00%	11.26%	100.00%	11.09%	100.00%	13.26%	100.00%	11.00%	100.00%
NE Regional	17.26%	100.00%	13.78%	100.00%	11.93%	100.00%	21.50%	100.00%	12.50%	100.00%	10.94%	100.00%	15.36%	100.00%	10.46%	100.00%	20.66%	100.00%	20.10%	100.00%
MBTA	11.83%	92.90%	12.73%	91.80%	11.73%	94.10%	13.01%	94.10%	13.00%	90.60%	15.62%	91.80%	18.05%	90.60%	14.03%	95.30%	5.81%	98.80%	16.38%	90.60%
Total	12.46%	94.20%	12.54%	93.30%	11.49%	95.20%	13.61%	95.20%	12.79%	92.30%	15.44%	93.30%	16.83%	92.30%	13.59%	96.20%	7.22%	99.00%	16.08%	92.30%

Indicates two best simulation runs
Indicates two worst simulation runs

Notes & Assumptions

The simulations were run under randomization a total of ten times, omitting the two worst and two best simulation results and averaging the remaining six runs.
This analysis was modeled for the PM period only to test the operations during the most congested period of operations at South Station.

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SOUTH STATION
EXPANSION

Appendix F - Transportation Documentation

June 2016

massDOT
Massachusetts Department of Transportation

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2. Summary of Findings 1
3. Methodology 1
4. Analysis Results 2
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1. Introduction

This supplemental Transportation Documentation was prepared to support the South Station Expansion (SSX) project Final Environmental Impact Report (FEIR), in response to comments received on the SSX Draft Environmental Impact Report (DEIR). The purpose of this documentation is to present an updated transit capacity analysis that further clarifies the impacts an increase in ridership at South Station, due to the Preferred Alternative (DEIR Alternative 1 – Transportation Improvements Only), would have on future capacity of the MBTA's rapid transit services, including light rail and bus rapid transit lines.

2. Summary of Findings

Projected ridership demands for the MBTA's Red, Silver, Green, Orange, and Blue Lines were compared to available vehicle capacities as informed by the MBTA's current policy for acceptable levels of crowding. Findings of the transit vehicle loading analysis indicate that the Preferred Alternative would not result in crowding that exceeds the maximum load capacity as informed by MBTA policy beyond those impacts that would otherwise occur in the No Build Alternative. Therefore, no additional mitigation measures would be required to address capacity constraints on rapid transit services.

3. Methodology

This section presents the methodology used to identify the impacts of the Preferred Alternative on public transportation vehicle crowding. The updated transit capacity analysis was developed and provided by the Central Transportation Planning Staff (CTPS) based on 2035 Build Year forecasts from the CTPS travel demand model. DEIR Appendix 9 (Part 3), *Ridership Forecasting Technical Report*, provides a detailed description of the methodology and assumptions used to prepare travel demand forecasts for the SSX project.

The rapid transit vehicle loading analysis considered the Peak Load Point on each rapid transit line that directly serves South Station as well as major connecting services, including the:

- Red Line;
- Silver Lines 1, 2, and proposed Silver Line Gateway service to Chelsea;
- Silver Line 4;
- Silver Line 5 (connection at Downtown Crossing);
- Green Line (connection at Park Street);
- Orange Line (connection at Downtown Crossing); and
- Blue Line (connection at Government Center and State Street).

For each rapid transit line analyzed, the Peak Load Points during the AM and PM peak periods were first identified. By analyzing the passenger loads at the highest demand segment, and confirming that there is available capacity remaining, it would stand to reason that there is excess capacity on the remainder of the line. The Peak Load Points, and their associated projected passenger volumes, were identified from the CTPS travel demand model for the 2035 No Build and 2035 Preferred Alternatives. The modeled three hour peak period passenger volumes were then factored by CTPS to represent the peak 15 minutes, the time period when the highest ridership occurs. The ratio between the peak three hours and the peak 15 minutes was calculated by CTPS utilizing Automated Fare Collection (AFC) data from FY2012 for the AM and PM time periods. This ratio was applied to the three hour peak period passenger demands to derive the peak 15 minute results. The peak 15 minute passenger demands were then compared to the system's capacity for handling them, as informed by the MBTA's policy for vehicle load standards. Maximum policy capacities were calculated by adding the number of seats in a vehicle to the maximum number of standing passengers permitted. The number

of standing passengers permitted was calculated by dividing the available floor square footage per vehicle by the maximum allowed square footage per standing passenger on a MBTA rapid transit vehicle (3.76 square feet per passenger, as derived from fleet roster policy capacities in the MBTA's *Ridership and Service Statistics*[1] and vehicle specifications).

It is important to note that the capacity analyzed per the vehicle load standard is not the absolute maximum number of passengers that can fit into a transit vehicle (also referred to by the MBTA as "crush capacity"). The calculated vehicle load standards informed by MBTA policy are established for passenger comfort and assume fewer passengers per vehicle than the "crush capacity". For the purposes of this analysis, the more conservative vehicle load standard was assessed.

Based on the proposed 2035 Build Year rapid transit operating headways for each line and direction, which were assumed to be the same as 2012 Existing Year headways, the number of trainsets in service during the AM and PM peak 15 minutes was estimated. Fractional trainsets were rounded up to reflect the peak number of trains in the peak 15 minute period. The following trainset lengths were assumed for the 2035 Build Year analysis: six car trainsets were assumed for all heavy rail lines, consisting of the Red, Orange and Blue Lines; three car trainsets were assumed for the Green Line (light rail line); and single cars were assumed for the Silver Line bus rapid transit (BRT) service. Using the maximum policy capacity per trainset and the number of trainsets per peak 15 minutes, the maximum policy load capacity for the peak 15 minutes was established for each rapid transit service.

Tabular summaries of capacity, demand, and the associated volume-to-capacity (V/C) ratios for the rapid transit lines evaluated as part of the transit vehicle loading analysis were prepared by CTPS and are provided in the following section.

4. Analysis Results

Results of the transit vehicle loading analysis for the AM peak period, for the 2035 No Build Alternative and the 2035 Preferred Alternative, are summarized in Tables 1 and 2, respectively. The PM peak period results for the 2035 No Build Alternative and the 2035 Preferred Alternative, respectively, are summarized in Tables 3 and 4. The analysis compared the projected peak 15 minute demand from the CTPS travel demand model to available capacity using the conservative loading standards informed by MBTA policy. V/C ratios greater than 1.0 indicate that the average demand during the peak 15 minutes exceeds available capacity as informed by MBTA policy. Findings of the transit vehicle loading analysis indicate that the Preferred Alternative would not result in crowding that exceeds the maximum load capacity as informed by MBTA policy beyond those impacts that would otherwise occur in the No Build Alternative.

[1] Massachusetts Bay Transportation Authority. *Ridership and Service Statistics, Fourteenth Edition.* 2014.

Table 1 — 2035 No Build Alternative, AM Peak Analysis Using Scheduled Headways

			AM Peak Period Train Set Info						AM Peak 15 minute Service Info						3-hour Data
Rapid Transit Service	Most Crowded Segment (From CTPS Travel Demand Model)	Peak 15 minute period	Headway (min.)	Cars / Train Set	Car Seated Capacity	Car Policy Max Load	Train Set Seated Capacity	Train Set Policy Max Load	Train Sets	Seated Capacity	Service Policy Max Load	Modeled Volume	Volume / Seated Capacity	Volume / Policy Max Load	Modeled Volume
Red Line NB	N Quincy - JFK/UMass	8:00 - 8:15	8.5	6	59	142	354	852	2	708	1,704	1,700	2.40	1.00	13,700
Red Line SB	Central Square - Kendall Square	8:30 - 8:45	4.3	6	59	142	354	852	4	1,416	3,408	3,030	2.14	0.89	18,620
Green Line Central Subway EB	Hynes - Copley	8:15 - 8:30, 8:30 -8 :45	2.2	3	46	100	138	300	7	966	2,100	1,980	2.05	0.94	12,310
Green Line Central Subway WB	Haymarket - Government Center	8:30 - 8:45	1.9	3	46	100	138	300	8	1,104	2,400	1,960	1.78	0.82	13,490
Silver Line WFL/Gateway EB	South Station - Courthouse	8:15 - 8:30	1.7	1	45	65	45	65	9	405	585	670	1.65	1.15	4,120
Silver Line WFL/Gateway WB	Courthouse - South Station	8:45 - 9:00	1.7	1	45	65	45	65	9	405	585	340	0.84	0.58	2,120
Silver Line 4 NB	E Berkeley - Herald	8:15 - 8: 30	10.0	1	57	79	57	79	2	114	158	110	0.96	0.70	940
Silver Line 4 SB	Tufts Med Ctr - Herald	7:00 - 7:15	10.0	1	57	79	57	79	2	114	158	60	0.53	0.38	530
Silver Line 5 NB	E Berkeley - Herald	7:45 - 8:00	10.0	1	57	79	57	79	2	114	158	150	1.32	0.95	1,300
Silver Line 5 SB	Tufts Med Ctr - Herald	8:15 - 8:30	10.0	1	57	79	57	79	2	114	158	100	0.88	0.63	830
Orange Line NB	Tufts Med Ctr - Chinatown	8:30 - 8:45	4.5	6	58	124	348	744	4	1,392	2,976	1,870	1.34	0.63	14,200
Orange Line SB	Community College - North Station	8:15 - 8:30	4.5	6	58	124	348	744	4	1,392	2,976	2,210	1.59	0.74	16,840
Blue Line NB	State - Aquarium	7:00 - 7:15	4.5	6	35	95	210	570	4	840	2,280	250	0.30	0.11	2,410
Blue Line SB	Maverick - Aquarium	8:30 - 8:45	4.5	6	35	95	210	570	4	840	2,280	1,470	1.75	0.64	13,380

Table 2 — 2035 Preferred Alternative, AM Peak Analysis Using Scheduled Headways

			AM Peak Period Train Set Info						AM Peak 15 minute Service Info						3-hour Data
Rapid Transit Service	Most Crowded Segment (From CTPS Travel Demand Model)	Peak 15 minute period	Headway (min.)	Cars / Train Set	Car Seated Capacity	Car Policy Max Load	Train Set Seated Capacity	Train Set Policy Max Load	Train Sets	Seated Capacity	Service Policy Max Load	Modeled Volume	Volume / Seated Capacity	Volume / Policy Max Load	Modeled Volume
Red Line NB	N Quincy - JFK/UMass	8:00 - 8:15	8.5	6	59	142	354	852	2	708	1,704	1,700	2.40	1.00	13,700
Red Line SB	Central Square - Kendall Square	8:30 - 8:45	4.3	6	59	142	354	852	4	1,416	3,408	3,030	2.14	0.89	18,620
Green Line Central Subway EB	Hynes - Copley	8:15 - 8:30, 8:30 -8 :45	2.2	3	46	100	138	300	7	966	2,100	1,980	2.05	0.94	12,310
Green Line Central Subway WB	Haymarket - Government Center	8:30 - 8:45	1.9	3	46	100	138	300	8	1,104	2,400	1,960	1.78	0.82	13,490
Silver Line WFL/Gateway EB	South Station - Courthouse	8:15 - 8:30	1.7	1	45	65	45	65	9	405	585	700	1.73	1.20	4,320
Silver Line WFL/Gateway WB	Courthouse - South Station	8:45 - 9:00	1.7	1	45	65	45	65	9	405	585	350	0.86	0.60	2,170
Silver Line 4 NB	E Berkeley - Herald	8:15 - 8: 30	10.0	1	57	79	57	79	2	114	158	110	0.96	0.70	940
Silver Line 4 SB	Tufts Med Ctr - Herald	7:00 - 7:15	10.0	1	57	79	57	79	2	114	158	60	0.53	0.38	530
Silver Line 5 NB	E Berkeley - Herald	7:45 - 8:00	10.0	1	57	79	57	79	2	114	158	150	1.32	0.95	1,300
Silver Line 5 SB	Tufts Med Ctr - Herald	8:15 - 8:30	10.0	1	57	79	57	79	2	114	158	100	0.88	0.63	830
Orange Line NB	Tufts Med Ctr - Chinatown	8:30 - 8:45	4.5	6	58	124	348	744	4	1,392	2,976	1,940	1.39	0.65	14,700
Orange Line SB	Community College - North Station	8:15 - 8:30	4.5	6	58	124	348	744	4	1,392	2,976	2,210	1.59	0.74	16,840
Blue Line NB	State - Aquarium	7:00 - 7:15	4.5	6	35	95	210	570	4	840	2,280	250	0.30	0.11	2,410
Blue Line SB	Maverick - Aquarium	8:30 - 8:45	4.5	6	35	95	210	570	4	840	2,280	1,470	1.75	0.64	13,380

Table 3 — 2035 No Build Alternative, PM Peak Analysis Using Scheduled Headways

			PM Peak Period Train Set Info						PM Peak 15 minute Service Info						3-hour Data
Rapid Transit Service	Most Crowded Segment (From CTPS Travel Demand Model)	Peak 15 minute period	Headway (min.)	Cars / Train Set	Car Seated Capacity	Car Policy Max Load	Train Set Seated Capacity	Train Set Policy Max Load	Train Sets	Seated Capacity	Service Policy Max Load	Modeled Volume	Volume / Seated Capacity	Volume / Policy Max Load	Modeled Volume
Red Line NB	Park St - Charles/MGH	5:30 - 5:45	4.3	6	59	142	354	852	4	1,416	3,408	3,630	2.56	1.07	27,830
Red Line SB	JFK/Umass - N Quincy	5:00 - 5:15	8.5	6	59	142	354	852	2	708	1,704	1,830	2.58	1.07	13,380
Green Line Central Subway EB	Boylston - Park St	5:15 - 5:30	1.3	3	46	100	138	300	12	1,656	3,600	1,690	1.02	0.47	16,100
Green Line Central Subway WB	Arlington - Copley	5:00 - 5:15	1.3	3	46	100	138	300	12	1,656	3,600	2,070	1.25	0.58	16,670
Silver Line WFL/Gateway EB	South Station - Courthouse	5:15 - 5:30	1.7	1	45	65	45	65	9	405	585	330	0.81	0.56	2,380
Silver Line WFL/Gateway WB	Courthouse - South Station	5:30 - 5:45	1.7	1	45	65	45	65	9	405	585	830	2.05	1.42	5,000
Silver Line 4 NB	E Berkeley - Herald	5:15 - 5:30	10.0	1	57	79	57	79	2	114	158	70	0.61	0.44	660
Silver Line 4 SB	Herald - E Berkeley	5:00 - 5:15	10.0	1	57	79	57	79	2	114	158	70	0.61	0.44	630
Silver Line 5 NB	Herald-Tufts Med	5:00 - 5:15	10.0	1	57	79	57	79	2	114	158	110	0.96	0.70	1,670
Silver Line 5 SB	Herald - E Berkeley	5:00 - 5:15	10.0	1	57	79	57	79	2	114	158	140	1.23	0.89	1,350
Orange Line NB	State - Haymarket	5:00 - 5:15	4.5	6	58	124	348	744	4	1,392	2,976	1,780	1.28	0.60	13,650
Orange Line SB	Chinatown - Tufts Med	5:15 - 5:30	4.5	6	58	124	348	744	4	1,392	2,976	1,830	1.31	0.61	14,580
Blue Line NB	Aquarium - Maverick	5:00 - 5:15	4.5	6	35	95	210	570	4	840	2,280	1,560	1.86	0.68	13,510
Blue Line SB	Maverick - Aquarium	5:15 - 5:30	4.5	6	35	95	210	570	4	840	2,280	510	0.61	0.22	5,290

Table 4 — 2035 Preferred Alternative, PM Peak Analysis Using Scheduled Headways

			PM Peak Period Train Set Info						PM Peak 15 minute Service Info						3-hour Data
Rapid Transit Service	Most Crowded Segment (From CTPS Travel Demand Model)	Peak 15 minute period	Headway (min.)	Cars / Train Set	Car Seated Capacity	Car Policy Max Load	Train Set Seated Capacity	Train Set Policy Max Load	Train Sets	Seated Capacity	Service Policy Max Load	Modeled Volume	Volume / Seated Capacity	Volume / Policy Max Load	Modeled Volume
Red Line NB	Park St - Charles/MGH	5:30 - 5:45	4.3	6	59	142	354	852	4	1,416	3,408	3,630	2.56	1.07	27,830
Red Line SB	JFK/Umass - N Quincy	5:00 - 5:15	8.5	6	59	142	354	852	2	708	1,704	1,840	2.60	1.08	13,390
Green Line Central Subway EB	Boylston - Park St	5:15 - 5:30	1.3	3	46	100	138	300	12	1,656	3,600	1,690	1.02	0.47	16,110
Green Line Central Subway WB	Arlington - Copley	5:00 - 5:15	1.3	3	46	100	138	300	12	1,656	3,600	2,080	1.26	0.58	16,680
Silver Line WFL/Gateway EB	South Station - Courthouse	5:15 - 5:30	1.7	1	45	65	45	65	9	405	585	340	0.84	0.58	2,440
Silver Line WFL/Gateway WB	Courthouse - South Station	5:30 - 5:45	1.7	1	45	65	45	65	9	405	585	870	2.15	1.49	5,220
Silver Line 4 NB	E Berkeley - Herald	5:15 - 5:30	10.0	1	57	79	57	79	2	114	158	70	0.61	0.44	660
Silver Line 4 SB	Herald - E Berkeley	5:00 - 5:15	10.0	1	57	79	57	79	2	114	158	70	0.61	0.44	630
Silver Line 5 NB	Herald-Tufts Med	5:00 - 5:15	10.0	1	57	79	57	79	2	114	158	110	0.96	0.70	1,670
Silver Line 5 SB	Herald - E Berkeley	5:00 - 5:15	10.0	1	57	79	57	79	2	114	158	140	1.23	0.89	1,350
Orange Line NB	State - Haymarket	5:00 - 5:15	4.5	6	58	124	348	744	4	1,392	2,976	1,780	1.28	0.60	13,650
Orange Line SB	Chinatown - Tufts Med	5:15 - 5:30	4.5	6	58	124	348	744	4	1,392	2,976	1,900	1.36	0.64	15,110
Blue Line NB	Aquarium - Maverick	5:00 - 5:15	4.5	6	35	95	210	570	4	840	2,280	1,560	1.86	0.68	13,510
Blue Line SB	Maverick - Aquarium	5:15 - 5:30	4.5	6	35	95	210	570	4	840	2,280	510	0.61	0.22	5,290

5. Analysis Sensitivity Test

Because there are differences between scheduled headways and actual observed headways, it is important to understand how actual service levels can influence the severity of crowding issues. An additional analysis, using average observed headways from FY2012 AFC data as opposed to scheduled headways, was prepared by CTPS. This additional analysis is a sensitivity test of how the difference in capacity supplied from observed headways (as compared to the capacity supplied from scheduled headways) impacts crowding. Travel demand modeling was performed using only the scheduled headways, and therefore this sensitivity test assumed that demand does not change with less than optimal headways.

Results of the transit vehicle loading analysis using average observed headways for the AM peak period, for the 2035 No Build Alternative and the 2035 Preferred Alternative, are summarized in Tables 5 and 6, respectively. The PM peak period results for the 2035 No Build Alternative and the 2035 Preferred Alternative, respectively, are summarized in Tables 7 and 8. The analysis compared the projected peak 15 minute demand from the CTPS travel demand model to available capacity using the conservative loading standards informed by MBTA policy. V/C ratios greater than 1.0 indicate that the average demand during the peak 15 minutes exceeds available capacity as informed by MBTA policy. Findings of the transit vehicle loading analysis indicate that the Preferred Alternative would not result in crowding that exceeds the maximum load capacity as informed by MBTA policy more than impacts that would otherwise occur in the No Build Alternative.

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Table 5 — 2035 No Build Alternative, AM Peak Analysis Using Average Observed Headways

			AM Peak Period Vehicle Set Info						AM Peak 15 minute Service Info						3-hour Data
Rapid Transit Service	Most Crowded Segment (From CTPS Travel Demand Model)	Peak 15 minute period or Peak bus for SL4 and SL5	Headway (min.)	Cars / Train Set	Car Seated Capacity	Car Policy Max Load	Train Set Seated Capacity	Train Set Policy Max Load	Train Sets	Seated Capacity	Service Policy Max Load	Modeled Volume	Volume / Seated Capacity	Volume / Policy Max Load	Modeled Volume
Red Line NB	N Quincy - JFK/UMass	8:00 - 8:15	9.3	6	59	142	354	852	2	708	1,704	1,700	2.40	1.00	13,700
Red Line SB	Central Square - Kendall Square	8:30 - 8:45	4.8	6	59	142	354	852	4	1,416	3,408	3,030	2.14	0.89	18,620
Green Line Central Subway EB	Hynes-Copley	8:15 - 8:30, 8:30-8:45	2.3	3	46	100	138	300	7	966	2,100	1,980	2.05	0.94	12,310
Green Line Central Subway WB	Haymarket-Government Center	8:30 - 8:45	2.1	3	46	100	138	300	8	1,104	2,400	1,960	1.78	0.82	13,490
Silver Line WFL/Gateway EB	South Station - Courthouse	8:15 - 8:30	1.7	1	45	65	45	65	9	405	585	670	1.65	1.15	4,120
Silver Line WFL/Gateway WB	Courthouse - South Station	8:45 - 9:00	1.7	1	45	65	45	65	9	405	585	340	0.84	0.58	2,120
Silver Line 4 NB	Union Park - E Berkeley	0.359	15.0	1	57	79	57	79	1	57	79	110	1.93	1.39	940
Silver Line 4 SB	E Berkeley - Union Park	0.331	15.0	1	57	79	57	79	1	57	79	60	1.05	0.76	530
Silver Line 5 NB	E Berkeley - Herald	0.349	15.0	1	57	79	57	79	1	57	79	150	2.63	1.90	1,300
Silver Line 5 SB	Herald - E Berkeley	0.351	15.0	1	57	79	57	79	1	57	79	100	1.75	1.27	830
Orange Line NB	Tufts Med Ctr - Chinatown	8:30 - 8:45	5.6	6	58	124	348	744	3	1,044	2,232	1,870	1.79	0.84	14,200
Orange Line SB	Community College - North Station	8:15 - 8:30	5.3	6	58	124	348	744	3	1,044	2,232	2,210	2.12	0.99	16,840
Blue Line NB	State - Aquarium	6:30 - 6:45	4.2	6	35	95	210	570	4	840	2,280	250	0.30	0.11	2,410
Blue Line SB	Maverick - Aquarium	8:00 - 8:15	4.8	6	35	95	210	570	4	840	2,280	1,470	1.75	0.64	13,380

Table 6 — 2035 Preferred Alternative, AM Peak Analysis Using Average Observed Headways

			AM Peak Period Vehicle Set Info						AM Peak 15 minute Service Info						3-hour Data
Rapid Transit Service	Most Crowded Segment (From CTPS Travel Demand Model)	Peak 15 minute period or Peak bus for SL4 and SL5	Headway (min.)	Cars / Train Set	Car Seated Capacity	Car Policy Max Load	Train Set Seated Capacity	Train Set Policy Max Load	Train Sets	Seated Capacity	Service Policy Max Load	Modeled Volume	Volume / Seated Capacity	Volume / Policy Max Load	Modeled Volume
Red Line NB	N Quincy - JFK/UMass	8:00 - 8:15	9.3	6	59	142	354	852	2	708	1,704	1,700	2.40	1.00	13,700
Red Line SB	Central Square - Kendall Square	8:30 - 8:45	4.8	6	59	142	354	852	4	1,416	3,408	3,030	2.14	0.89	18,620
Green Line Central Subway EB	Hynes-Copley	8:15 - 8:30, 8:30-8:45	2.3	3	46	100	138	300	7	966	2,100	1,980	2.05	0.94	12,310
Green Line Central Subway WB	Haymarket-Government Center	8:30 - 8:45	2.1	3	46	100	138	300	8	1,104	2,400	1,960	1.78	0.82	13,490
Silver Line WFL/Gateway EB	South Station - Courthouse	8:15 - 8:30	1.7	1	45	65	45	65	9	405	585	700	1.73	1.20	4,320
Silver Line WFL/Gateway WB	Courthouse - South Station	8:45 - 9:00	1.7	1	45	65	45	65	9	405	585	350	0.86	0.60	2,170
Silver Line 4 NB	Union Park - E Berkeley	0.359	15.0	1	57	79	57	79	1	57	79	110	1.93	1.39	940
Silver Line 4 SB	E Berkeley - Union Park	0.331	15.0	1	57	79	57	79	1	57	79	60	1.05	0.76	530
Silver Line 5 NB	E Berkeley - Herald	0.349	15.0	1	57	79	57	79	1	57	79	150	2.63	1.90	1,300
Silver Line 5 SB	Herald - E Berkeley	0.351	15.0	1	57	79	57	79	1	57	79	100	1.75	1.27	830
Orange Line NB	Tufts Med Ctr - Chinatown	8:30 - 8:45	5.6	6	58	124	348	744	3	1,044	2,232	1,940	1.86	0.87	14,700
Orange Line SB	Community College - North Station	8:15 - 8:30	5.3	6	58	124	348	744	3	1,044	2,232	2,210	2.12	0.99	16,840
Blue Line NB	State - Aquarium	7:00 - 7:15	4.2	6	35	95	210	570	4	840	2,280	250	0.30	0.11	2,410
Blue Line SB	Maverick - Aquarium	8:30 - 8:45	4.8	6	35	95	210	570	4	840	2,280	1,470	1.75	0.64	13,380

Table 7 — 2035 No Build Alternative, PM Peak Analysis Using Average Observed Headways

Rapid Transit Service	Most Crowded Segment (From CTPS Travel Demand Model)	Peak 15 minute period or Peak bus for SL4 and SL5	PM Peak Period Train Set Info						PM Peak 15 minute Service Info						3-hour Data
			Headway (min.)	Cars / Train Set	Car Seated Capacity	Car Policy Max Load	Train Set Seated Capacity	Train Set Policy Max Load	Train Sets	Seated Capacity	Service Policy Max Load	Modeled Volume	Volume / Seated Capacity	Volume / Policy Max Load	Modeled Volume
Red Line NB	Park St - Charles/MGH	5:30 - 5:45	4.1	6	59	142	354	852	4	1,416	3,408	3,634	2.57	1.07	27,830
Red Line SB	South Station - Broadway	5:00 - 5:15	5.1	6	59	142	354	852	3	1,062	2,556	3,037	2.86	1.19	13,380
Green Line Central Subway EB	Prudential - Copley	5:15 - 5:30	9.1	3	46	100	138	300	2	276	600	393	1.42	0.66	16,100
Green Line Central Subway WB	Copley-Hynes	5:15 - 5:30	3.4	3	46	100	138	300	5	690	1,500	1,680	2.43	1.12	16,670
Silver Line WFL/Gateway EB	South Station - Courthouse	5:15 - 5:30	1.7	1	45	65	45	65	9	405	585	328	0.81	0.56	2,380
Silver Line WFL/Gateway WB	Courthouse - South Station	5:30 - 5:45	1.7	1	45	65	45	65	9	405	585	830	2.05	1.42	5,000
Silver Line 4 NB	E Berkeley - Herald	0.228	15.0	1	57	79	57	79	1	57	79	65	1.13	0.82	660
Silver Line 4 SB	Herald - E Berkeley	0.243	15.0	1	57	79	57	79	1	57	79	55	0.96	0.69	630
Silver Line 5 NB	Herald - Tufts Med Ctr	0.201	15.0	1	57	79	57	79	1	57	79	108	1.89	1.36	1,670
Silver Line 5 SB	Tufts Med Ctr - Herald	0.126	15.0	1	57	79	57	79	1	57	79	77	1.35	0.98	1,350
Orange Line NB	State - Haymarket	5:00 - 5:15	5.7	6	58	124	348	744	3	1,044	2,232	1,783	1.71	0.80	13,650
Orange Line SB	Chinatown - Tufts Med Ctr	5:15 - 5:30	5.2	6	58	124	348	744	3	1,044	2,232	1,830	1.75	0.82	14,580
Blue Line NB	Aquarium - Maverick	5:00 - 5:15	4.9	6	35	95	210	570	4	840	2,280	1,559	1.86	0.68	13,510
Blue Line SB	Maverick - Aquarium	3:15 - 3:30	6.1	6	35	95	210	570	3	630	1,710	474	0.75	0.28	5,290

Table 8 — 2035 Preferred Alternative, PM Peak Analysis Using Average Observed Headways

Rapid Transit Service	Most Crowded Segment (From CTPS Travel Demand Model)	Peak 15 minute period or Peak bus for SL4 and SL5	PM Peak Period Train Set Info						PM Peak 15 minute Service Info						3-hour Data
			Headway (min.)	Cars / Train Set	Car Seated Capacity	Car Policy Max Load	Train Set Seated Capacity	Train Set Policy Max Load	Train Sets	Seated Capacity	Service Policy Max Load	Modeled Volume	Volume / Seated Capacity	Volume / Policy Max Load	Modeled Volume
Red Line NB	Park St - Charles/MGH	5:30 - 5:45	4.1	6	59	142	354	852	4	1,416	3,408	3,634	2.57	1.07	27,830
Red Line SB	South Station - Broadway	5:00 - 5:15	5.1	6	59	142	354	852	3	1,062	2,556	3,037	2.86	1.19	13,390
Green Line Central Subway EB	Prudential - Copley	5:15 - 5:30	9.1	3	46	100	138	300	2	276	600	393	1.42	0.66	16,110
Green Line Central Subway WB	Copley-Hynes	5:15 - 5:30	3.4	3	46	100	138	300	5	690	1,500	1,680	2.43	1.12	16,680
Silver Line WFL/Gateway EB	South Station - Courthouse	5:15 - 5:30	1.7	1	45	65	45	65	9	405	585	329	0.81	0.56	2,440
Silver Line WFL/Gateway WB	Courthouse - South Station	5:30 - 5:45	1.7	1	45	65	45	65	9	405	585	882	2.18	1.51	5,220
Silver Line 4 NB	E Berkeley - Herald	0.228	15.0	1	57	79	57	79	1	57	79	65	1.13	0.82	660
Silver Line 4 SB	Herald - E Berkeley	0.243	15.0	1	57	79	57	79	1	57	79	55	0.96	0.69	630
Silver Line 5 NB	Herald - Tufts Med Ctr	0.201	15.0	1	57	79	57	79	1	57	79	108	1.89	1.36	1,670
Silver Line 5 SB	Tufts Med Ctr - Herald	0.126	15.0	1	57	79	57	79	1	57	79	77	1.35	0.98	1,350
Orange Line NB	State - Haymarket	5:00 - 5:15	5.7	6	58	124	348	744	3	1,044	2,232	1,783	1.71	0.80	13,650
Orange Line SB	Chinatown - Tufts Med Ctr	5:15 - 5:30	5.2	6	58	124	348	744	3	1,044	2,232	1,842	1.76	0.83	15,110
Blue Line NB	Aquarium - Maverick	5:00 - 5:15	4.9	6	35	95	210	570	4	840	2,280	1,559	1.86	0.68	13,510
Blue Line SB	Maverick - Aquarium	3:15 - 3:30	6.1	6	35	95	210	570	3	630	1,710	474	0.75	0.28	5,290

SOUTH STATION
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Appendix G – Construction Management Plan

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1. Introduction

The Construction Management Plan (CMP) will help guide the construction of the proposed South Station Expansion (SSX) project in Boston, Massachusetts. The CMP identifies key SSX project issues, considers mitigation measures, and serves as an overall plan for the project's construction activities.

An efficient, well-organized CMP contributes to the success of a project by minimizing impacts to the environment and the surrounding community. This CMP identifies potential key issues and organizational structures in the preliminary engineering process to avoid impacts during construction. The following provides the proposed CMP, which will be further refined as the project advances. A final CMP will be developed by the contractor and approved by the Massachusetts Department of Transportation (MassDOT) and other project stakeholders prior to construction.

2. Project Description

The SSX project consists of the 49-acre site located in and around the existing South Station Transportation Center, which includes the South Station Rail/Transit Terminal, South Station Bus Terminal, and the existing U.S. Postal Service (USPS) property and adjacent roadways. The project also includes two layover facility sites, located at Widett Circle, and Readville – Yard 2. Figure 1 presents a project location map. The project consists of five primary construction components. The proposed work for each of these components is described as follows:

2.1. USPS Facility Demolition

The SSX project would acquire and demolish the USPS General Mail Facility (GMF) located on an approximately 14-acre site along Dorchester Avenue adjacent to South Station.

2.2. South Station Track Construction

The SSX project would expand the South Station Terminal by adding seven tracks and four new platforms for a total of 20 tracks and 11 platforms. Additionally, several existing tracks and platforms would be reconfigured. Platform lengths would be designed to meet Amtrak's and the MBTA's future berthing requirements. Tower 1 Interlocking[1] would be modified and approach interlockings would be reconfigured to reduce conflicting movements through the terminal area and improve efficiencies.

2.3. South Station Terminal Expansion

New structures totaling approximately 385,000 sf, including an expanded headhouse and major station entrance along Dorchester Avenue, would be added at the South Station Terminal to provide larger passenger circulation and waiting areas, as well as amenities such as retail and food outlets.

[1] An interlocking is a segment of railroad infrastructure that consists of track, turnouts, and signals linked (interlocked) in a way that allows for train operations to succeed each other in a logical, predetermined, safe order to prevent conflicting train movements.

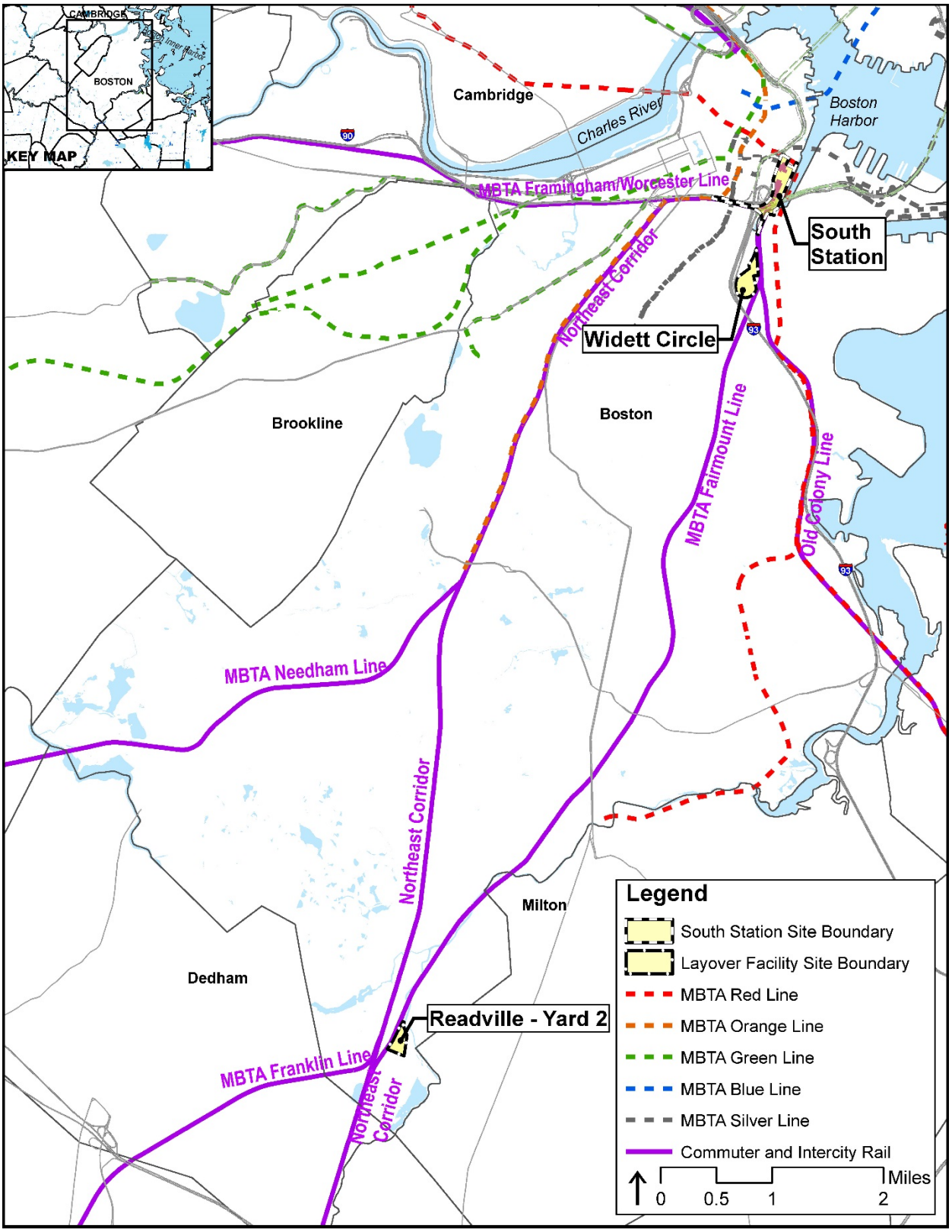

Figure 1 — Project Location Plan

2.4. Dorchester Avenue and Harborwalk Reconstruction

Currently, the majority of Dorchester Avenue, in the immediate vicinity of South Station, is in private use by the USPS in support of its operations, with limited public access allowed for USPS customers and MBTA commuters. The SSX project would restore Dorchester Avenue in its entirety for public and station access. Restoration of Dorchester Avenue would reconnect it to Summer Street as a public way. It would include landscaping and improved pedestrian and cycling connections and facilities, including adjacent sidewalks and crosswalks. Restoration also would include construction of an extension of the Harborwalk along the reopened Dorchester Avenue. The Harborwalk extension would include landscaping and street furniture, as well as add more than one acre of open space to the area. Should the acquisition of the USPS advance before funding is identified for the entire project, MassDOT may consider moving forward with the demolition of the USPS and reopening of Dorchester Avenue (along with associated Harborwalk improvements) before other project elements in order to provide improved public access along the Fort Point Channel.

2.5. Layover Facility Construction

The SSX project is proposing to provide layover space by expanding or establishing additional facilities at Widett Circle and Readville – Yard 2 to make railroad operations at South Station more efficient and better able to accommodate future service growth.

Construction activities at the layover sites would include construction of utilities, roads, and site civil work, including drainage structures.

3. Construction Plan

Construction activities include the areas defined in Section 2, Project Description, and are generally categorized as rail, vertical construction, utility relocation and installation, and site and roadway development. The rail-related construction activities would be performed in close coordination with the operating railroads, including the MBTA and its commuter rail operator (currently Keolis), Amtrak, and CSX Transportation, Inc. (CSXT). Flagging (protection of trains and employees) and inspection services would be provided by the operating railroad for a given section of track. Other, non-rail-related construction activities would be coordinated with the City of Boston, utility companies, and other public and private entities as appropriate. Laydown/staging locations are envisioned in the following locations:

- South Station: The existing Dorchester Avenue, currently closed to the public, would be used as a staging area for the demolition of the USPS facility. Once the USPS building is demolished and cleared, the former building site can be used for staging of the headhouse, rail work, and Dorchester Avenue construction.
- Widett Circle: It is anticipated that the yard construction can be staged in segments that would allow for staging to be done in a separate location within the property.
- Readville – Yard 2: It is anticipated that the yard construction can be staged in segments that would allow for staging to be done in a separate location within the yard.

Figure 2 presents the proposed construction sequencing for the SSX project.

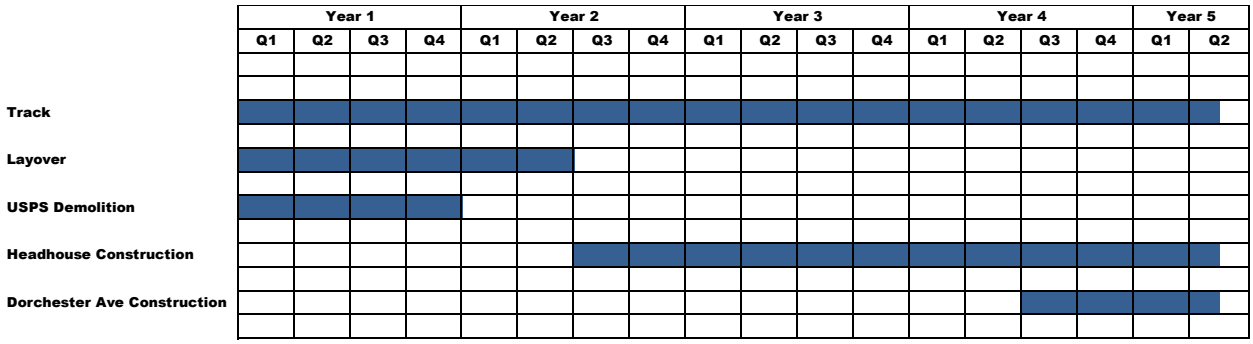

Figure 2 — Proposed Construction Sequencing

The specific work activities described below further define the construction schedule and sequencing, as well as major work activities for each area.

3.1. USPS Facility Demolition

Demolition of the USPS located on Dorchester Avenue would take approximately one year, and would occur at the beginning of the project to make the site available for future construction and staging/laydown space. The site demolition can occur simultaneously with rail construction. The general construction sequencing at the USPS site would be as follows:

- Mobilization and site preparation;
- Demolition of existing structures;
- Excavation; and
- Foundation installation for the proposed track and headhouse.

3.2. South Station Track Construction

Installation of the seven new tracks, four platforms, and connections and modifications to Tower 1 Interlocking, and reconfiguration of the approach interlockings would take approximately 4.5 years. The new track and platforms would largely be constructed outside of the existing South Station footprint. The work at Tower 1 Interlocking would require track outages, but would largely be completed during non-revenue hours (12:00 a.m. to 5:00 a.m.), 55-hour weekend closures (Friday 10:00 p.m. to Monday 5:00 a.m.), and using other methods that minimize disruption to passenger service. The general construction sequencing for track installation at the South Station site would be as follows:

- Mobilization and site preparation;
- Rail infrastructure installation;
- Station platforms; and
- Track testing.

3.3. South Station Terminal Expansion

Construction of the expanded headhouse and egress components at the South Station site would take approximately three years, beginning in the first quarter of Year 3 and ending in the fourth quarter of Year 5. Construction activities would include passenger circulation and waiting areas, concourse areas, and connections to the South Station Bus Terminal and parking garage. Passenger use most likely would

not be affected during peak hours for the station. Disruptions would be largely minimized during other hours by completing utility connection work in non-public spaces, and using non-revenue hours for public space connections. Once areas are no longer needed for construction activities, they would be returned to public use. The general construction sequencing for headhouse construction at South Station would be as follows:

- Mobilization and site preparation;
- Installation of utility connections;
- Construction of the headhouse, including concourse and passenger circulation and waiting areas;
- Construction of the egress components; and
- Site furnishings and signage installation.

3.4. Dorchester Avenue and Harborwalk Reconstruction

Reconstruction of Dorchester Avenue would take approximately one year. Construction activities would include reconstruction of the vehicle travel lanes, raising a portion of Dorchester Avenue and the historic seawall, construction of the parking lanes, Harborwalk, bicycle accommodations, streetscape, and landscaping as well as utility and drainage installation. The general construction sequencing for reconstruction of Dorchester Avenue would be as follows:

- Mobilization and site preparation;
- Utility and drainage installation;
- Construction of the roadway and parking lanes;
- Construction of the Harborwalk including bicycle accommodations; and
- Construction of streetscape and landscaping.

3.5. Layover Facility Construction

3.5.1. Widett Circle Layover Facility

Installation of the new tracks, connections and modifications to the existing tracks, and the shore power (electrical plug-ins) at the Widett Circle site would take approximately 1.5 years. Construction would include track, signals, and facility program functions such as crew quarters and parking, but would also include demolition of existing structures at the Widett Circle facility. The general construction sequencing for track and infrastructure installation at the Widett Circle site would be as follows:

- Mobilization and site preparation;
- Existing building demolition;
- Rail infrastructure installation;
- Utility installation and non-rail site construction;
- Installation of shore power facilities; and
- Track testing.

MassDOT understands that the City of Boston is considering Widett Circle as a potential location for future air-rights development. This would require decking over any future layover yard in order to

provide a ground plane on which to build. The proposed design of the Widett Circle layover facility can accommodate and does not preclude future air rights development opportunities, which are outside the scope of this project. As any City efforts advance, MassDOT will continue to coordinate with the City to help realize a future development vision for Widett Circle.

3.5.2. Readville – Yard 2 Layover Facility

Because Readville is an active layover yard, construction would be staged to minimize impacts to daily operations. Installation of the new tracks, connections and modifications to the existing tracks, and the shore power at the Readville – Yard 2 Layover Facility would take approximately six months. Construction would include track, signals, and facility program functions such as crew quarters and parking, as well as extension of the existing noise barrier. The general construction sequencing for track and infrastructure installation at the Readville – Yard 2 site would be as follows:

- Mobilization and site preparation;
- Rail infrastructure installation;
- Utility installation and non-rail site construction;
- Installation of shore power facilities; and
- Track testing.

4. Construction Impacts and Mitigation

Construction at the South Station site would be phased to provide a balance between duration and impact. To minimize impacts to rail services and passengers, the contractor(s) would use overnight work windows, weekend work outages, and strategic track closures. As the project advances through preliminary design, MassDOT would coordinate with transportation providers and rail agencies to identify opportunities for strategic closures and alternatives for replacement services.

An example of a strategic track closure would be to shut down for a period of time the Old Colony Line coming into South Station and allow around-the-clock construction at South Station on tracks impacted by this route. Commuter rail passengers would be bused to South Station or transferred from the Old Colony Line at Braintree to the Red Line. This would allow the contractor an extended work window.

Any outages along the NEC would impact Amtrak operations and maintenance activities. This could require overnight closures of South Station for Amtrak with use of Back Bay Station and shuttles as a temporary replacement. Closures that would impact Amtrak's access to maintenance facilities would have to be planned in advance. Freight operations would not be impacted as operations are not in the construction vicinity. Construction would not adversely impact South Station Bus Terminal operations.

Final construction staging/phasing would be determined as part of final design through discussions with MassDOT and project stakeholders. Once the project is advertised and bid, the selected contractor would also have the opportunity to propose changes to the construction staging/phasing as part of the bid process, to be approved by MassDOT and other agencies before implementation.

Work at the layover facilities and within the Dorchester Avenue and USPS building envelope can occur unencumbered, subject to state, local and agency provisions.

Passenger use most likely would not be affected during peak hours for the station, with the exception of building over the existing terminal and during strategic track closure events. Disruptions would be largely minimized during other operating hours by completing utility connection work in non-public spaces, and using non-revenue hours for public space connections. Once areas are no longer needed for construction activities, they would be returned to public use.

Construction access to the South Station site would occur from Dorchester Avenue, currently closed to traffic due to the USPS facility. All work to be completed at South Station would be completed by construction workers and materials utilizing Dorchester Avenue. Construction access to the Widett Circle site would occur from Widett Circle, a local street immediately adjacent to the layover facility site that connects to the I-93 frontage road. All existing businesses in this location would be closed prior to construction; therefore no access to these businesses during construction would be required. Construction access to the Readville – Yard 2 site would occur from Wolcott Court, a local street immediately adjacent to the layover facility site and the only public roadway that provides access to this location.

The construction sites would be secured by fence enclosures that can also be closed completely during non-work hours. During work hours, workers on site are required to carry proper identification and training cards. Visitors would be required to sign in at the construction entrance. Construction sites would maintain a security guard presence, as determined by state, local and agency requirements.

The contractor would be required to abide by the requirements set forth in MassDOT's *Supplemental Specifications to the 1988 English Standard Specifications for Highways and Bridges*, dated July 1, 2015. The rail and local agencies also identify these requirements in their specifications. In an effort to minimize contradiction or redundant language in the construction contract(s), the specifications would reference the MassDOT specifications only. Any additional requirements would be added to the special provisions of the specifications, as noted in the sections below. The following subsections describe the impacts and mitigation methods to be used by the contractor, based on the proposed construction schedule.

4.1. Air Quality Impacts

Temporary air quality impacts can be categorized as either dust or emissions. The contractor would be required to control dust and emissions both during active construction activities and during non-work hours. Per MassDOT requirements, the contractor would be required to submit a Dust and Emissions Control Plan for approval by MassDOT prior to beginning any construction activities. The plan would include notation of all the surrounding areas potentially affected, specific equipment used and the measures taken to minimize the emissions made by the equipment to those surrounding areas. These requirements are defined in Subsection 7.02 Pollution Prevention, Part I, Air Pollution Requirements in MassDOT's *Supplemental Specifications to the 1988 English Standard Specifications for Highways and Bridges*, dated July 1, 2015. The MassDOT specifications include the dust and emissions control requirements as identified in the Draft Environmental Impact Report (DEIR). As the design is progressed to final plans and specifications, additional special provisions would be added to the specifications by the designer and owners.

4.2. Soil Erosion and Sediment Control

The contractor would be required to implement Soil Erosion and Sediment Control measures prior to beginning construction, and maintain and/or replace these measures throughout construction as required by the controlling agency. These requirements are defined in section 767, Mulching, Seed for Erosion Control in MassDOT's *Supplemental Specifications to the 1988 English Standard Specifications for Highways and Bridges*, dated July 1, 2015. The MassDOT specifications include the soil erosion and

sediment control requirements as identified in the DEIR. As the design is progressed to final plans and specifications, additional special provisions would be added to the specifications by the designer and owners.

Additionally, the contractor would be required to follow the provisions set forth by the Boston Water Sewer Commission (BWSC) Stormwater Permit, and the Massachusetts Water Resources Agency (MWRA) 8(m) Permit. If groundwater is encountered during the construction activities, an MWRA Temporary Construction Site Dewatering Discharge Permit will be required pursuant to 360 C.M.R. 10.091- 10.094. The contractor would prepare a Stormwater Pollution Prevention Plan (SWPPP) that documents all of these efforts for construction prior to beginning any work. The SWPPP is to be approved by MassDOT and state and federal agencies prior to the commencement of work.

4.3. Rare and/or Endangered Species

There are no known rare and/or endangered species resident to the project sites.

4.4. Noise Impacts

The contractor would be required to control dust and emissions both during active construction activities and during non-work hours. Per MassDOT requirements, the contractor would be required to submit a Noise Control Plan for approval by MassDOT prior to beginning any construction activities. The plan would include notation of all the surrounding areas potentially affected, specific equipment used and the measures taken to minimize the noise made by the equipment to those surrounding areas. These requirements are defined in Subsection 7.02 Pollution Prevention, Part I, Air Pollution Requirements in MassDOT's Supplemental Specifications to the *1988 English Standard Specifications for Highways and Bridges*, dated July 1, 2015. Additionally, the Contractor's work would be completed in accordance with the City of Boston's noise control ordinances. If night work is required, the proper permits would be obtained and the more stringent noise regulations would apply. These requirements are typically included in the project-specific specifications by MassDOT prior to the contract being released for bid. The MassDOT specifications include noise impact requirements as identified in the DEIR. As the design is progressed to final plans and specifications, additional special provisions would be added to the specifications by the designer and owners.

4.5. Traffic Impacts

Travel to and from the South Station project site for workers would be divided into on-site vehicles, off-site shuttles, and transit. Based on 2014 census data from the U.S. Department of Commerce[2] it is assumed that 48% of construction workers would drive in a single occupancy vehicle, 7% would carpool, and 45% would use transit.

For the South Station site, an analysis of the construction sequencing and the proposed work shows the total vehicles generated would average 280 single occupancy vehicles (SOVs) per work day. This was

[2] The Census Data from the 2014 American Community Survey (ACS) was extrapolated to include only Drive Alone, Carpool, and Public Transit to make up 100% of commuting employees. Based on the *Percentage of Workers By Commuting Modes: U.S. Department of Commerce, United States Census Bureau American FactFinder, "Means of Transportation To Work By Selected Characteristics for Workplace Geography - 2014 American Community Survey 1-Year Estimates"* http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_14_1YR_S0804&prodType=table

calculated by estimating the number of workers based on construction value for each major work element including track, layover, headhouse, and Dorchester Avenue construction and USPS demolition. The project site can accommodate the projected necessary construction vehicles along Dorchester Avenue and areas outside of the building footprint during USPS demolition and South Station Terminal Expansion. Additional vehicles, if required, would be accommodated at offsite parking locations, where shuttles would be provided to minimize the construction-related traffic. The work hours for the project generally would not overlap with the morning and afternoon peak hours for the roadways adjacent to the project area, and should not constitute a significant increase in traffic above current levels. A detailed traffic management plan (TMP) would be submitted for the project with the intent of phasing the project construction so that any disruptions to roadways and sidewalks adjacent to the project area are either minimized or mitigated. Mitigation could include time-of-day restrictions for vehicle on-site access to specific areas.

For the two layover sites, 205 vehicles at Widett Circle and 58 vehicles at Readville – Yard 2 are expected to be generated. Parking capacity is adequate at both locations; therefore, no additional shuttling would be required.

All three project construction areas can be fully enclosed without changes to existing pedestrian, bicycle and motor vehicle paths. Short term closures (typically a week or less) may occur for tie-in construction, and would require approved plans submitted by the contractor.

The MassDOT specifications include traffic impact requirements as identified in the DEIR. As the design is progressed to final plans and specifications, additional special provisions would be added to the specifications by the designer and owners.

4.6. Work Hours

MassDOT work is typically restricted to a normal 8-hour day, 5-day week, with the contractor and all subcontractors working on the same shift. No work would be done on Saturdays, Sundays, holidays, or the day before or after a holiday without prior approval of MassDOT. Night work typically requires a two week notification to the public. These requirements are defined in Subsection 7.09 Public Safety and Convenience, in MassDOT's *Supplemental Specifications to the 1988 English Standard Specifications for Highways and Bridges*, dated July 1, 2015. The MassDOT specifications include work hour and design constraint limitations as identified in the DEIR. As the design is progressed to final plans and specifications, additional special provisions would be added to the specifications by the designer and owners.

For work in the South Station Terminal and Track areas, work would occur during overnight work windows (12:00 a.m. to 5:00 a.m.) and 55-hour weekend work outages (Friday 10:00 p.m. to Monday 5:00 a.m.) to minimize impacts to rail service and passengers.

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Appendix H – DEIR Web Links

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All project documents are provided on the South Station Expansion website:
http://www.massdot.state.ma.us/southstationexpansion/Documents.aspx

The following DEIR documents can be found at:
http://www.massdot.state.ma.us/southstationexpansion/DEIR.aspx

DEIR Report Chapters

- Compiled Main Document (without Appendices)
- Cover Page
- Table of Contents
- List of Tables
- List of Figures
- Chapter 1 - Summary of the Proposed Project
- Chapter 2 - Project Purpose and Need
- Chapter 3 - Alternatives Analysis and Concept Design
- Chapter 4 - Potential Environmental Impacts and Mitigation
- Chapter 5 - Sustainable Design and Climate Change Adaptation
- Chapter 6 - Construction
- Chapter 7 - Request for a Public Benefit Review and Determination
- Chapter 8 - Draft Section 61 Findings & Mitigation
- Chapter 9 - Response to Comments on the ENF
- Chapter 10 - DEIR Circulation List
- Chapter 11 - Acronyms and Glossary
- Chapter 12 - References

DEIR Appendices

- Compiled Appendices
- Appendix 1 - Public Involvement and Agency Coordination Technical Report
- Appendix 2 - Track Configuration Alternatives Analysis - Tier 1 Screening Technical Report
- Appendix 3 - Environmental Justice and Title VI Technical Report
- Appendix 4 (Part 1) - Socioeconomic Conditions Technical Report
- Appendix 4 (Part 2) - Land Use and Zoning Technical Report
- Appendix 5 - Natural Resources Technical Report
- Appendix 6 - Coastal Resources Technical Report
- Appendix 7 - Water Quality and Stormwater Technical Report
- Appendix 8 - Water and Wastewater Technical Report
- Appendix 9 (Part 1) - Traffic Analysis Technical Report

- Appendix 9 (Part 2) - Pedestrian Circulation Analysis Technical Report
- Appendix 9 (Part 3) - Ridership Forecasting Technical Report
- Appendix 9 (Part 4) - Transit Capacity Analysis Technical Report
- Appendix 10 - Air Quality Technical Report
- Appendix 11 - Noise and Vibration Technical Report
- Appendix 12 - Greenhouse Gas Emissions Technical Report
- Appendix 13 (Part 1) - Phase 1 Archaeological Reconnaissance Survey Technical Report
    - *Due to the Archaeologically sensitive nature of this material, it has been removed in accordance with Section 304 of the National Historic Preservation Act (NHPA) as amended, 16 U.S.C. 470W-3(a) TO (c) and Massachusetts General Laws C.9, S.26A(1) and 27C under 950 CMR 70.13(7).*
- Appendix 13 (Part 2) - Historic Architectural Resources Technical Report
- Appendix 14 - Site Contamination and Hazardous Materials Technical Report

Attachments

- All Compiled Attachments